WATER WORKS & SEWERAGE

LAKE WINONA

Little Rock's Mountain Supply

CLOUDS OF BACTERIA-LADEN DUST ENDANGERED THE WATER SUPPLY!

On a rush job enlarging a state airport, tractors, trucks, shovels and graders were working 16 hours a day—during the worst drought in the history of the community. As a consequence, thick clouds of bacteria-laden dust drifted almost constantly over two nearby reservoirs, increasing the bacteria count.

The water works engineer proved equal to the situation. He began at once devising means of getting Per*chloro*n into action. Per*chloro*n is a super-test calcium hypochlorite that provides an excellent stand-by source of chlorine. It dissolves readily, is unusually stable and has more than 70% available chlorine. Per*chloro*n has performed vital service in many water supply emergencies.

In the case in question, here is how Per*chloro*n was used. A 1½-ton truck, carrying an air compressor, pump, wooden barrel and high pressure hose, was put into service. A mixture of one can of Per*chloro*n to a barrel of water was sprayed on the surface from the moving truck, or by a man walking along the embankment.

Per*chloro*n at the rate of two or three parts per million was sprayed on the reservoirs twice a week.

RESULT: Low bacteria count—and only three hours time consumed per application.

Per*chloro*n will serve *you* just as dependably in any situation demanding emergency sanitation. During these times much of the Per*chloro*n manufactured is, of course, going into essential wartime needs. That leaves less for our customers and you can help this situation by: *Ordering only for regular current needs —well in advance.*

Penn Salt representatives are experienced in many of the unusual problems that face water works engineers today. Call on them, without obligation, for advice and cooperation. And if you do not have your *free* copy of the valuable booklet on Per*chloro*n, write today to Dept. WWS.

Perchloron

REG. U. S. PAT. OFF.

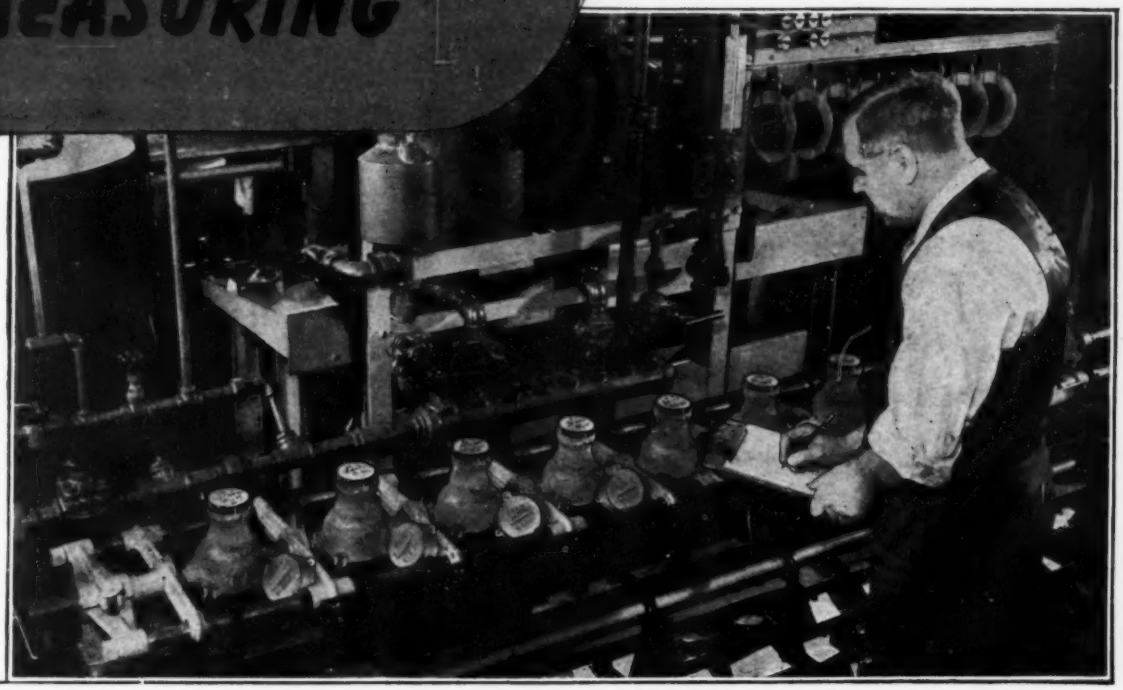
PENNSYLVANIA SALT MANUFACTURING COMPANY

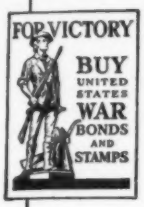
Chemicals

1000 WIDENER BUILDING, PHILADELPHIA, PA.

New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma

LET'S KEEP 'EM MEASURING





TODAY buyers have more reason than ever to be glad that they bought the best quality meters, those designed to last for years. Under present conditions it may be difficult for many to secure all of their requirements in new measuring equipment. Here is when the value built into Pittsburgh-National Meters will prove its worth, for these meters have been designed with those extras that provide high performance standards even after serving a normal life span.

Pittsburgh-National Meters, too, are economical to repair and replacement part stocks are adequate. An intelligent program of meter reconditioning and maintenance can, in many cases, largely supplant the need for new meters.

To aid in keeping them measuring for the duration, we have in recent months reworked many of our old parts bulletins and issued new ones so as to simplify the matter of ordering replacements. Contact the nearest Pittsburgh-National District Office for the literature you need.

WHEN YOU BUY NEW METERS

THE *Empire* VICTORY METER

Top measurement value in so-called War Model Meters is provided by the Empire Victory and the Pittsburgh Ironside. Both have fully rust-proofed cast iron cases; both are fitted with the Pittsburgh-National developed molded glass register box; both conserve over 70% of the bronze normally used in the construction of meters of this size. After the emergency is over, these meters can be readily converted to bronze cases if desired.

The Empire Victory Meter employs the time-tested, oscillating piston principle of measurement, using the famous Empire balanced piston. The Pittsburgh Ironside Meter is of the popular disc type, having the same inner-working mechanism that has been proven in thousands of Pittsburgh Arctic and Tropic Meters. Both are accurate measuring instruments, each possessing its own individual characteristics. Together they provide the necessary types to handle practically every domestic meter requirement or preference of water works men.

THE PITTSBURGH IRONSIDE METER

PITTSBURGH-NATIONAL METERS

THE MOST COMPLETE LINE OF WATER METERS IN THE WORLD

PITTSBURGH EQUITABLE METER COMPANY

NEW YORK · BROOKLYN · DES MOINES · MEMPHIS · OAKLAND · TULSA · CHICAGO · BOSTON

MERCO NORDSTROM VALVE COMPANY
Main Offices, Pittsburgh, Pa.

NATIONAL METER DIVISION, Brooklyn, N. Y.

KANSAS CITY · PHILADELPHIA · SAN FRANCISCO · LOS ANGELES · SEATTLE · HOUSTON · COLUMBIA · BUFFALO

WATER WORKS & SEWERAGE, April, 1943. Volume 90. Number 4. Published monthly by Gillette Publishing Co., 330 South Wells Street, Chicago, Ill. Per copy, 25c. Subscription rate, United States, $2.00 per year; Canada, $2.00 per year; Foreign, $3.00 per year. Entered as Second Class Matter, June 2, 1931, at the Post Office at Chicago, Ill., under act of March 3, 1879.

Ready to go...

A centrifugal casting machine in one of our plants—drawn by Hugh Ferriss.

When you get the "green light" on your deferred plans for improvements and extensions you will find us ready to give you quick action on your orders for cast iron pipe and fittings. Batteries of Super-de Lavaud centrifugal casting machines in three plants—machines which have been largely devoted to the war effort for the past two years—are ready to go all-out to meet the accumulated needs of water supply, gas and sewerage systems throughout America. Our specialized fittings plant, and special castings foundries in other plants, are also ready and equipped as never before.

UNITED STATES PIPE & FOUNDRY CO.

General Offices: Burlington, New Jersey. ***Plants and Sales Offices throughout the U. S. A.***

FOR OVER 50 YEARS

Sincerely yours*

HAS BEEN PROUDLY INSCRIBED—IN EFFECT IF NOT IN FACT—
ON THOUSANDS OF BUILDERS FLOW METERS AND CONTROLLERS

FIFTY YEARS' EXPERIENCE

IN THE DESIGN AND MANUFACTURE OF

BUILDERS
WATER AND SEWAGE WORKS
Equipment

AT YOUR SERVICE

FOR

POST-WAR PLANNING

A.W.W.A. CONVENTION
Cleveland, June 15-18

Correspondence
Invited

* Back in the old days, second-rate Roman sculptors who made unsightly nicks in the marble would secretly patch up the flaws with a mixture of wax and marble dust. These patches would drop out later on and honest artists suffered so much that they began labelling their handiwork "Sine Cera" (i.e. "Without Wax"); from this we derive our word "sincere" meaning honest, genuine, real.

ARMY E NAVY
AWARDED
AUG. 1st. 1942

BUILDERS-PROVIDENCE, INC.

Est. 1820 • DIVISION OF BUILDERS IRON FOUNDRY • Inc. 1853

9 CODDING STREET • PROVIDENCE, R. I.

BUILDERS
RECORDING·INDICATING·CONTROLLING
Instruments

THIS 17 YEAR OLD BADGER METER GOT A NEW LEASE ON LIFE AT LOW COST
WATER WORKS Superintendent
OK
Conservation Sounds a Patriotic Call

CONSERVATION of meters is a patriotic duty. The Water Works Superintendent has a double conservation responsibility—first to conserve water and second, to conserve equipment. He must take steps to put water meters in "good as new" condition so that they can continue to curb waste and protect revenue.

Those farsighted communities which invested in Badger Water Meters will be faced with less expense in their adjustment and repair programs. . . . Badger's low maintenance cost — as little as 1c per meter per year in many communities — is vital today — not only to present users but to those who are planning to put in meters to conserve water and save revenue.

BADGER METER MANUFACTURING CO., MILWAUKEE, WIS.

Branch Offices: New York City • Tampa, Fla. • Seattle, Wash. • Savannah, Ga. • Kansas City, Mo. Marshalltown, Iowa • Waco, Texas • Los Angeles, Cal. • Chicago Ill. • Philadelphia, Pa.

PLAN NOW TO ATTEND THE CONFERENCE ON WAR WINNING WATER WORKS OPERATION -AT THE CARTER AND STATLER HOTELS CLEVELAND, OHIO

JUNE 15 - 18

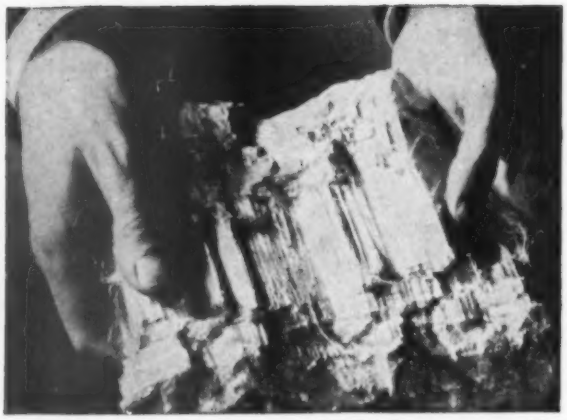
MAKE HOTEL RESERVATIONS EARLY

This space contributed by

INDUSTRIAL CHEMICAL SALES DIVISION
WEST VIRGINIA PULP AND PAPER COMPANY
230 PARK AVENUE NEW YORK, N. Y.

One of Nature's most

MAKES POSSIBLE THIS DURABLE, EFFICIENT *TRANSITE PIPE* FOR WATER LINES

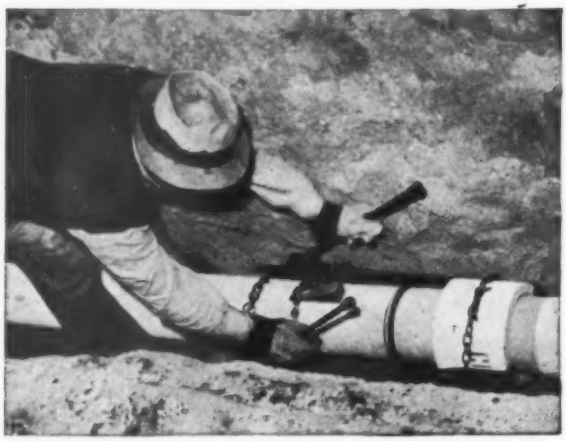


ASBESTOS. This is asbestos—a magic mineral with the permanence of stone. Asbestos fibers in J-M Transite Pipe serve as reinforcement—make possible Transite's combination of strength and light weight.

ASBESTOS is undoubtedly one of the most remarkable products of inorganic nature. As found in the natural rock, asbestos itself is as dense as the rock in which it occurs. Yet when picked apart or "teased up," it separates into a mass of fibers, silky in appearance but amazingly strong. The tensile strength of asbestos fibers runs from 100,000 lb. to 400,000 lb. per sq. in.

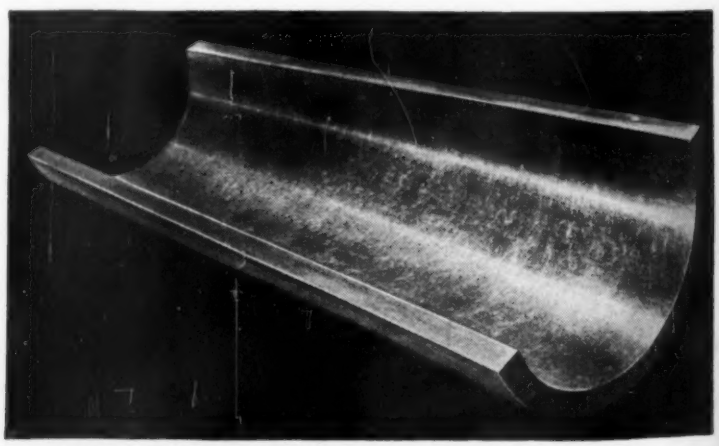
In producing Johns-Manville Transite Pipe, these virtually indestructible asbestos fibers are thoroughly mixed with cement where they serve as reinforcement, making possible Transite's uniformly high strength and light weight.

These features, in combination with Transite's long life, ease of installation, operating efficiency and minimum maintenance, have



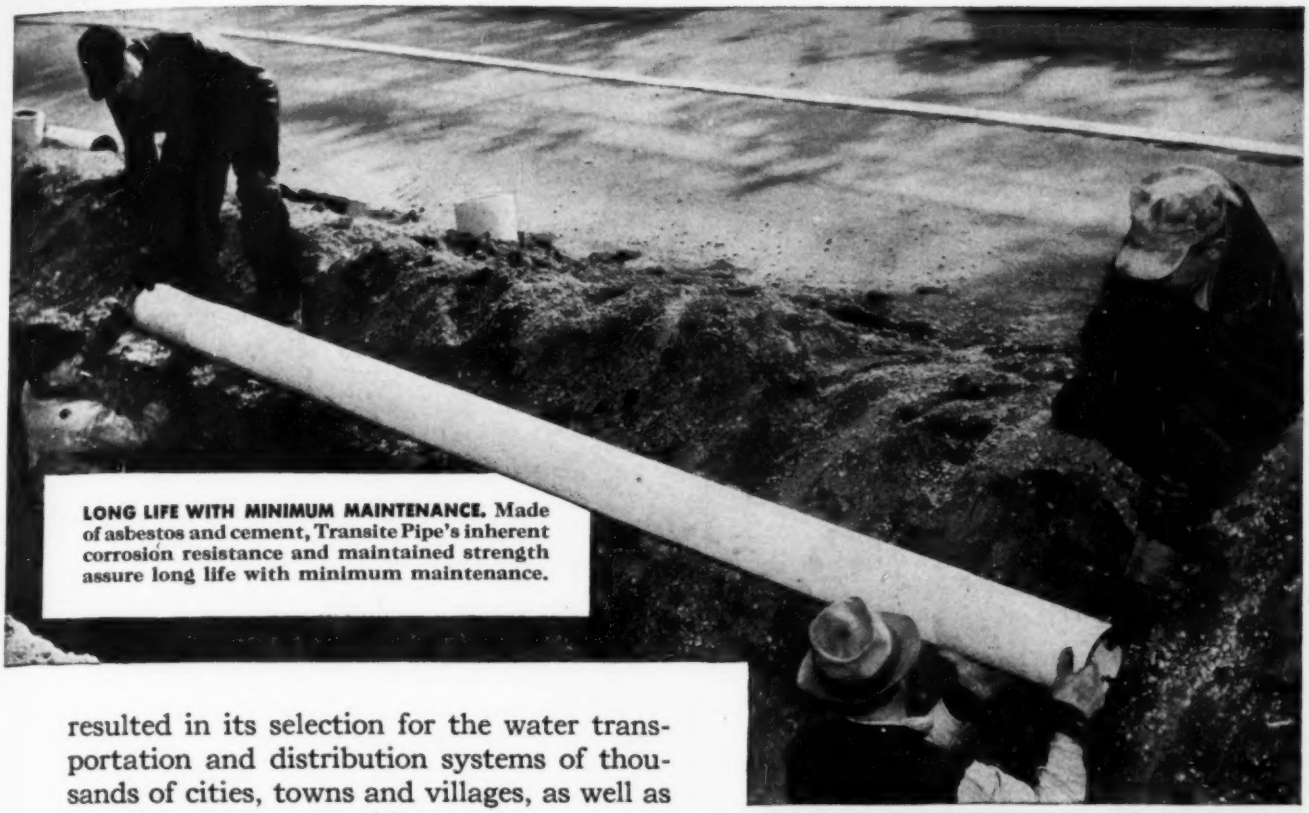
RAPID ASSEMBLY. The absence of hot-poured jointing materials eliminates the necessity of maintaining heating equipment at the trench and makes the assembly of Simplex Couplings a fast, economical operation easily accomplished by unskilled workmen.

EASY TO HANDLE. Light in weight . . . requires fewer men for handling . . . and only the larger sizes require mechanical handling equipment.



HIGH CARRYING CAPACITY. Because Transite is non-metallic, its original smooth interior surface remains permanently unaffected by the destructive effects of tuberculation.

Indestructible Materials--*Asbestos*



LONG LIFE WITH MINIMUM MAINTENANCE. Made of asbestos and cement, Transite Pipe's inherent corrosion resistance and maintained strength assure long life with minimum maintenance.

resulted in its selection for the water transportation and distribution systems of thousands of cities, towns and villages, as well as for military camps and bases.

Available today to supply military and essential civilian needs, Transite Pipe offers a combination of economic advantages not found in any other pipe material. For complete details, write for copy of the Transite Pressure Pipe book TR-11A.

For information on Transite Sewer Pipe for lower cost sewage disposal systems, ask for book TR-21A. Johns-Manville, 22 East 40th Street, New York, N. Y.

TRANSITE PIPE IN THE WAR. Virtually all new Transite Pipe is now being used for military camps and bases, and for essential civilian needs.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

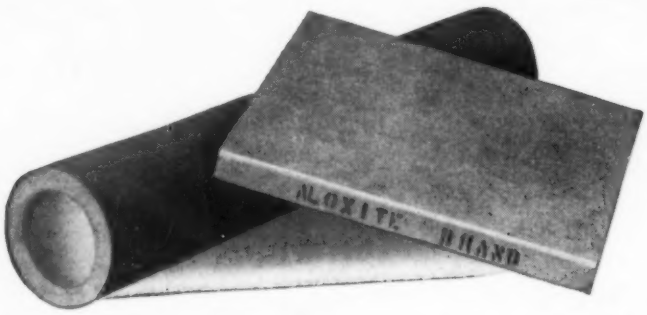
Transite Pipe

AN ASBESTOS PRODUCT

FOR EFFICIENT, ECONOMICAL WATER AND SEWER LINES

What is War Time Availability of

ALOXITE BRAND DIFFUSER PLATES AND TUBES AND ALOXITE BRAND UNDERDRAIN PLATES!



ALOXITE Brand Diffuser Plates and Tubes and Aloxite Brand Underdrain Plates are made from the same basic materials and by the same methods as grinding wheels, hones and similar abrasive products. These abrasive products are indispensable to war production, and are therefore subject to priority regulations.

It follows that Diffusers and Underdrain Plates are subject to similar priority regulations. They can still be supplied for both war time plants and vital replacements for existing municipal installations. We are scheduling orders in accordance with certified priority ratings.

War time service to sanitary engineers, superintendents and others interested in Diffusers and Underdrain Plates remains the same as in peace time. We are ready to help you with your problems at all times.

POROUS CARBORUNDUM PRODUCTS

THE CARBORUNDUM COMPANY • **NIAGARA FALLS, N. Y.**

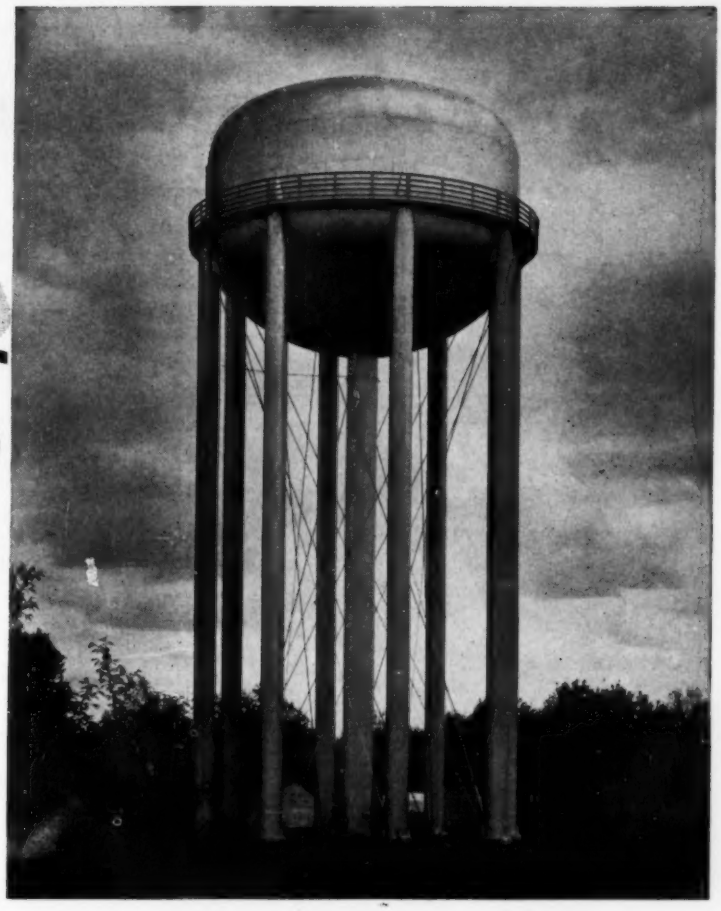
REG. U. S. PAT. OFF.

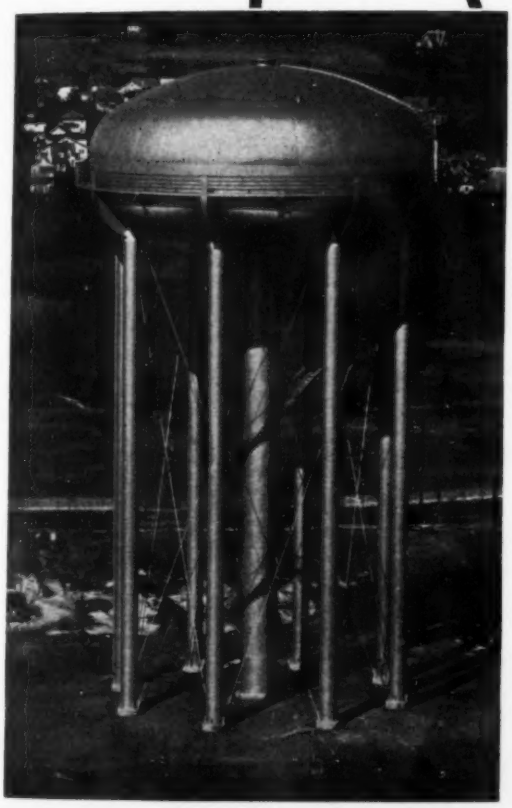
MANUFACTURERS OF GRINDING WHEELS, COATED ABRASIVES, SUPER REFRACTORIES, HEATING ELEMENTS

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company)

LOOKING AT IT FROM ALL ANGLES





ELEVATED STORAGE IS ... *Hard to Beat!*

THE chances are, wherever Horton elevated tanks have been installed as sound peacetime investments, you'll find enthusiastic boosters for elevated storage. For this type of water storage is hard to beat when it comes to securing more uniform distribution pressures—lower pumping costs—increased protection against fire hazard—and all around improvement in service.

A study of how Horton elevated storage tanks are helping municipalities and industrial concerns meet wartime demands . . . could benefit cities in planning post-war water supply systems.

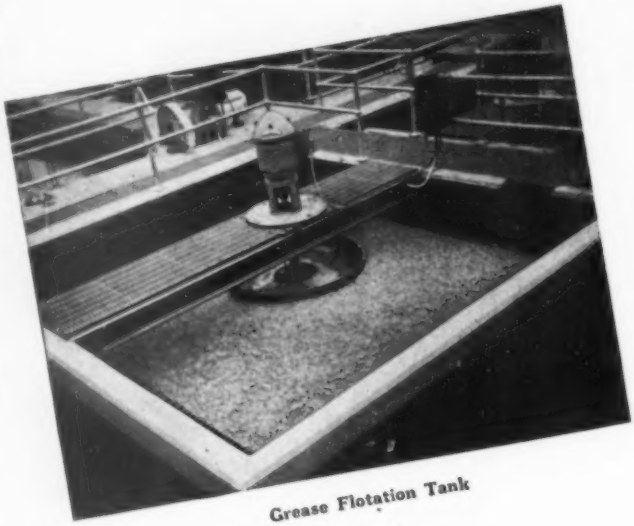
The two units illustrated on this page are installed in the Kalamazoo, Michigan, water supply system. The tank above has a capacity of 350,000 gals. and the unit at the left has a 750,000-gal. capacity. Both have modern tubular columns.

CHICAGO BRIDGE & IRON COMPANY

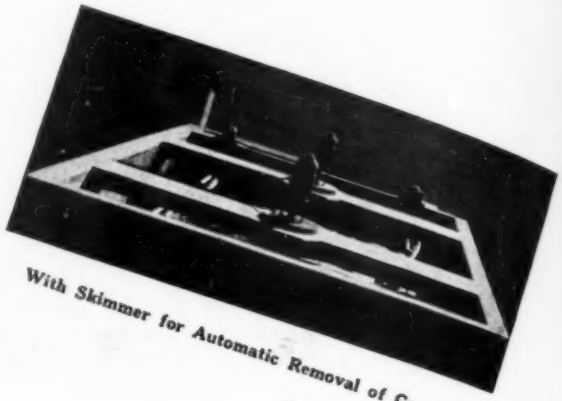
Chicago.....2198 McCormick Bldg.
New York.3390-165 Broadway Bldg.
Cleveland.....2262 Guildhall Bldg.
Havana.....402 Edificio Abreu
Birmingham..1598 North 50th Street
Tulsa.....1646 Hunt Bldg.
Houston.....5615 Clinton Drive
Philadelphia...1644-1700 Walnut St.
Washington.....330 Bowen Bldg.
San Francisco.....1063 Rialto Bldg.
Greenville.....York Street

Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA. *In Canada:* HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

"American" Grease Flotation



Grease Flotation Tank



With Skimmer for Automatic Removal of Grease

The "AMERICAN" Grease Flotation unit effectively removes greases, oils and other ether soluable materials from sewage and industrial wastes.

OPERATION RECORDS SHOW:

Additional BOD and suspended solids removal in Primary through beneficial aeration and grease removal.

Ideal Aerobic conditions throughout the entire plant yields additional over-all removal.

RECOMMENDED APPLICATIONS:

To expand the treating capacity of existing plants.
To alleviate overloaded or over "greased" plants.
To cure septic primary settling tanks.
Installation can be made in existing primary tanks.
No compressors or air lines are required.

Simple Slow-moving Helical Wiper Moves Surface Grease into Trough Without Hand Attention

Buy American

AMERICAN ESTABLISHED 1868

THE AMERICAN WELL WORKS

AURORA ILLINOIS

MANUFACTURERS OF

Pumping,—Sewage Treatment,—

and Water Purification Equipment

The Flags are going up all over America!

In this fateful hour, 130,000,000 Americans have pledged that we *shall not* fail. That is why every Army-Navy "E" that rises over the war plants of the nation causes American hearts to beat stronger with hope, with courage — and with renewed determination to fulfill their sacred pledge. For these flags are both a symbol of our strength . . . and a warning to our enemies that the day of their final destruction is drawing closer.

Today, the Army-Navy "E" flies over the Niagara Falls plant of the Mathieson Alkali Works. From this plant a continuous stream of chemicals flows into the nation's war industries . . . chlorine, caustic soda, ammonia, sodium methylate, sodium chlorite and high test calcium hypochlorite.

To the friends and industries who look to Mathieson for many of their essential chemical requirements, we express our appreciation for their cooperation and forbearance which has helped us maintain a record production of war materials. Teamwork like this will help raise other "E" flags over America's war plants — and will help keep them flying at full mast until victory is ours.

Mathieson **CHEMICALS**

THE MATHIESON ALKALI WORKS (INC.)
60 EAST 42ND STREET, NEW YORK, N. Y.

LIQUID CHLORINE . . . SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . BLEACHING POWDER . . . HTH PRODUCTS . . . AMMONIA, ANHYDROUS and AQUA . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . SODIUM CHLORITE PRODUCTS

History Repeats . . . The Bronze Age

Tremendous demand for copper and its alloys in making vital war materials bans use of the precious red metal for municipal, commercial and other civilian use.

Haya, mate of Harth the Mighty, was annoyed when she awoke that morning some thousands of years ago. Crouched on his haunches at the mouth of the crude shelter, her spouse was industriously pounding the family utensils and ornaments into weapons. If he bothered to explain at all, Harth grunted that the tribe was at WAR . . .

. . . cooking pot into sword

that because copper was essential to win the fight, household use of the gleaming metal was out for the duration.

And this year of war, 1943, found many a U. S. housewife in a similar dither. She wanted brass fixtures for the bathroom, copper gutters, flashing and bronze screens. But America was at war — victory was dependent on copper alloys for the machines and munitions of war. For home building the vital metal was out — until men again laid down their arms.

Supply. . . and Demand

America produces a great part of the world's copper, also a large percentage of the world's brass, an alloy of copper and zinc. No. 1 fabricator in the field is The American Brass Company, operating 13 U. S. A. and Canadian plants.

As a result of research started over a century ago, and continuing today, the industry has developed a thousand uses for copper and its alloys. American life is safer, more comfortable, convenient and attractive because of copper's many familiar advantages.

In peacetime, the output of copper is ample to supply the ever-increasing demands of industry and civilian needs. But war as it is fought today, requires the entire peacetime output, plus many millions of additional pounds.

Where it Goes

Hundreds of thousands of pounds of Anaconda Copper and Brass are turned out every day by American Brass Company workers for making shell cases alone. Imagine the amount needed for just calibre .50 machine gun cartridges, which may spew from the modern fighter plane at the rate of 3,500 per minute . . . and for the huge steel projectiles fired from heavy artillery and battleship guns, each of which requires a copper or copper alloy rotating band to give the projectile the spin that insures accuracy in flight.

Everdur* at War

Everdur Metal, Anaconda's well-known copper-silicon alloy, is likewise being produced in huge quantities for vital war uses. The very properties of exceptional strength, corrosion-resistance, rust-immunity, toughness and workability that have made Everdur such a great engineering metal for water works and sewage construction make it indispensable for tough war jobs—on both the fighting and production fronts. Only a few such applications are Coast Guard pilot houses . . . fuel and hydraulic lines in aircraft . . . drums for mixing tracer bullet powder.

*Reg. U.S. Pat. Off.

. . . Everdur pilot house

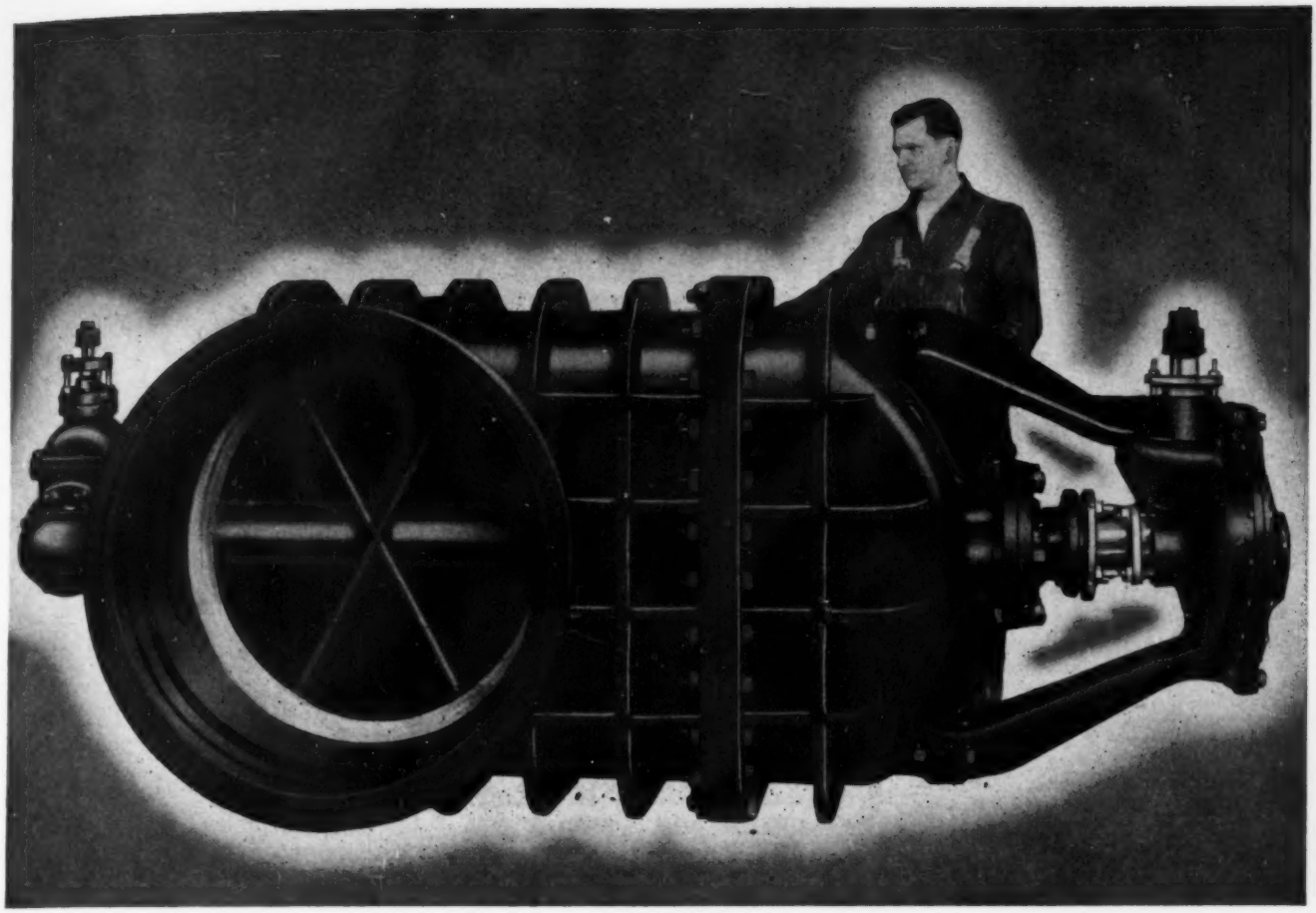
Wanted: Copper Scrap

As in the production of steel, scrap copper is important in the production of new metal. Mining capacity alone cannot meet the nation's expanded wartime needs. Scrap must make up the deficit. Inducement to those who think it isn't worthwhile to turn in the small quantity of scrap copper and brass they have on hand: relatively, a single pound of copper scrap is as important as 45 pounds of steel in prosecuting the war effort.

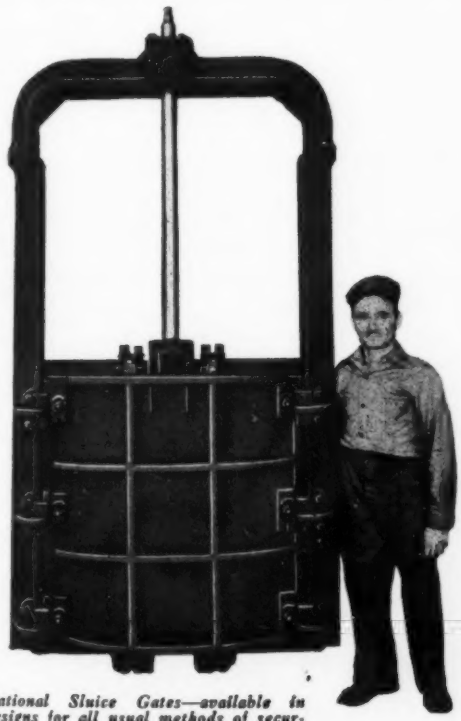
Published in the interest of a better informed war effort by

THE AMERICAN BRASS COMPANY ANACONDA

General Offices: Waterbury, Connecticut • *Subsidiary of Anaconda Copper Mining Company*



BIG OR SMALL . . . THESE VALVES ARE BUILT FOR BETTER SERVICE



National Sluice Gates—available in designs for all usual methods of securing the gate to its foundation.

Any gate valve is no stronger than its weakest point . . . *but there are no soft spots in a National Valve!* From knee-high units to giants twice a man's height, National Valves are built all down the line in painstaking fashion. Sound in design and backed by top workmanship and materials.

They're easy opening—easy closing. The simple but effective wedging mechanism does not become operative until the discs line up opposite the ports. At this point, the two lower spreaders and the upper spreader, all operating independently, exert a three-point spreading contact. This assures a well distributed pressure on the discs and a watertight valve.

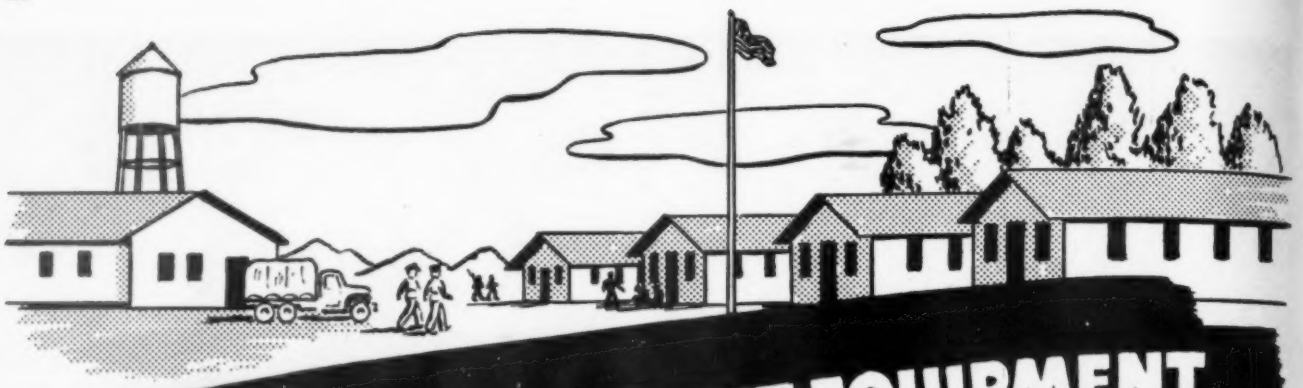
In opening the valve, the first movement releases the spreaders, which collapses the discs and makes operation easy under maximum pressure.

National Gate Valves are furnished with rising or non-rising stems and with hub, flanged, screwed, spigot or Universal ends. They can be operated manually, electrically or with hydraulic cylinders.

Send today for descriptive literature.

NATIONAL MACHINE WORKS

1558 N. Sheffield Avenue Chicago, Ill.



SEWAGE TREATMENT EQUIPMENT *for Wartime Needs*

ONE of Graver's most important wartime jobs is the design and manufacture of sewage treatment and disposal equipment for use at cantonments, airfields and other military establishments, as well as for industrial housing projects.

With our years of experience in this highly specialized work, plus engineering skill and modern manufacturing facilities, it is only natural that these important problems of sanitation are entrusted to Graver.

Graver Sanitation Equipment includes:

- Aerators
- Agitators
- Automatic Dosing Siphons
- Chemical Feeders
- Chemical Proportioners
- Chemical Treatment Plants
- Clarifiers, Primary and Secondary
- Coagulators
- Digesters
- Grease Removal Equipment
- Gas Holders
- Imhoff Combination Clarifiers
- Reactivator Clarifiers
- Rotary Distributors
- Skimmers
- Sludge Conditioners
- Sludge Dryers

Write Graver today. Our engineers will gladly work with you on any specific problem of sewage treatment and disposal.

WATER SOFTENERS
FILTRATION SYSTEMS
CLARIFIERS
SEWAGE EQUIPMENT
STEEL STORAGE TANKS
VAPOR CONSERVATION SYSTEMS
WELDED CONSTRUCTION
STRESS RELIEVING
X-RAYING
FABRICATED STEEL AND CORROSION-RESISTING PLATE

GRAVER

GRAVER TANK & MFG. CO., INC.

NEW YORK
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FAIRBANKS-MORSE TURBINE PUMPS

The F-M line offers complete range of capacities from 35 g.p.m. to 4000 g.p.m., for electric motor, Diesel or gasoline engine, or steam turbine drive. Open or closed impellers. Oil or water lubrication.

A SUDDEN boost of 10 per cent in power rates? You'd call it ridiculous—but many ten-year-old pumps of certain types, *even if as good as new,* take 10 per cent greater toll at the meter than today's Fairbanks-Morse models! And a 10 per cent reduction in power consumption is anything but ridiculous—especially now.

Before you arrange for increased power to meet heavier production schedules, eliminate power waste. Your resident Fairbanks-Morse Engineer can tell you quickly—without cost or obligation—whether or not the pumps you have are the types that exact the penalty of obsolescence. You may discover, as others have, that new pumps would solve your power problem today—and your cost problem tomorrow. Use your priority to buy for today with an eye on tomorrow's cost sheets. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

QUICK FACTS ON TRANSITE SEWER PIPE

FAST INSTALLATION . . .

Transite's long lengths reduce the number of joints needed in the line . . . its light weight permits easier, faster, more economical handling.

LESS INFILTRATION . . .

Fewer, tighter joints minimize leakage, cutting down on the load at the disposal plant.

HIGH DELIVERY CAPACITY . . .

This advantage of Transite Pipe frequently permits smaller pipe or flatter grades, resulting in shallower trenches.

AVAILABLE BOTH FOR FORCE MAINS AND GRAVITY LINES

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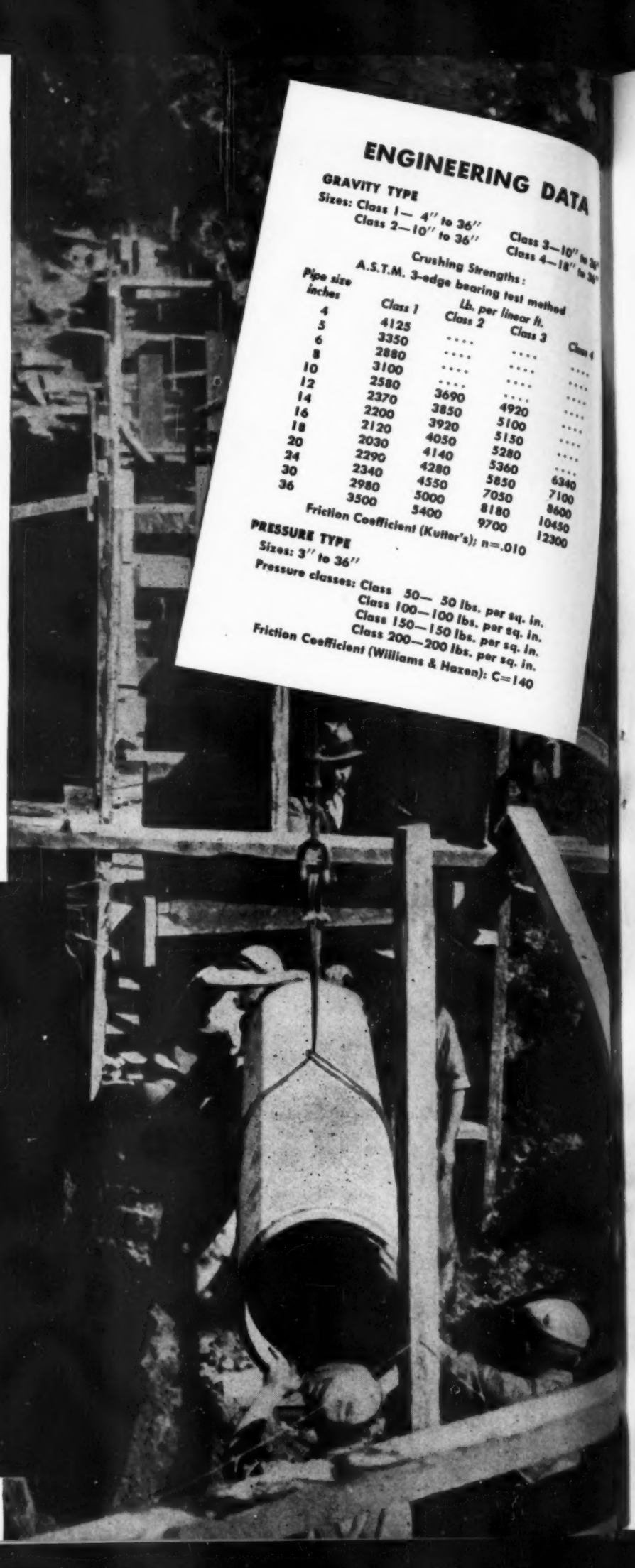
ENGINEERING DATA
GRAVITY TYPE
Sizes: Class 1— 4" to 36"
Class 2—10" to 36"
Class 3—10" to 36"
Class 4—18" to 36"
Crushing Strengths:
A.S.T.M. 3-edge bearing test method
Lb. per linear ft.
Pipe size inches
Class 1
Class 2
Class 3
Class 4
4 5 6 8 10 12 14 16 18 20 24 30 36
4125 3350 2880 3100 2580 2370 2200 2120 2030 2290 2340 2980 3500
3690 3850 3920 4050 4140 4280 4550 5000 5400
4920 5100 5150 5280 5360 5850 7050 8180 9700
6340 7100 8600 10450 12300
Friction Coefficient (Kutter's): n=.010
PRESSURE TYPE
Sizes: 3" to 36"
Pressure classes: Class 50— 50 lbs. per sq. in.
Class 100—100 lbs. per sq. in.
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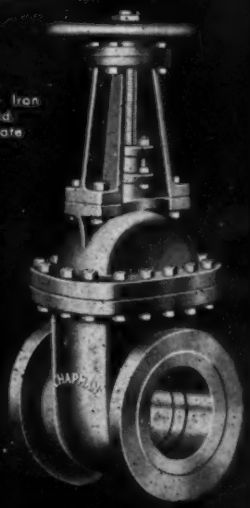

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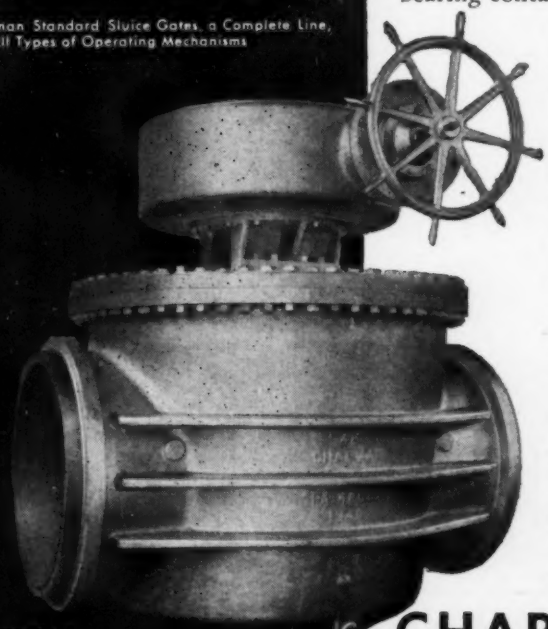

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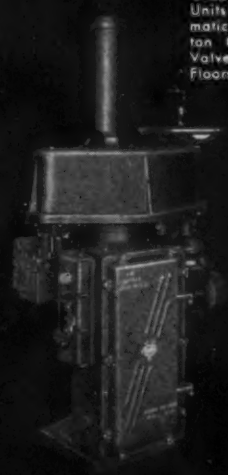

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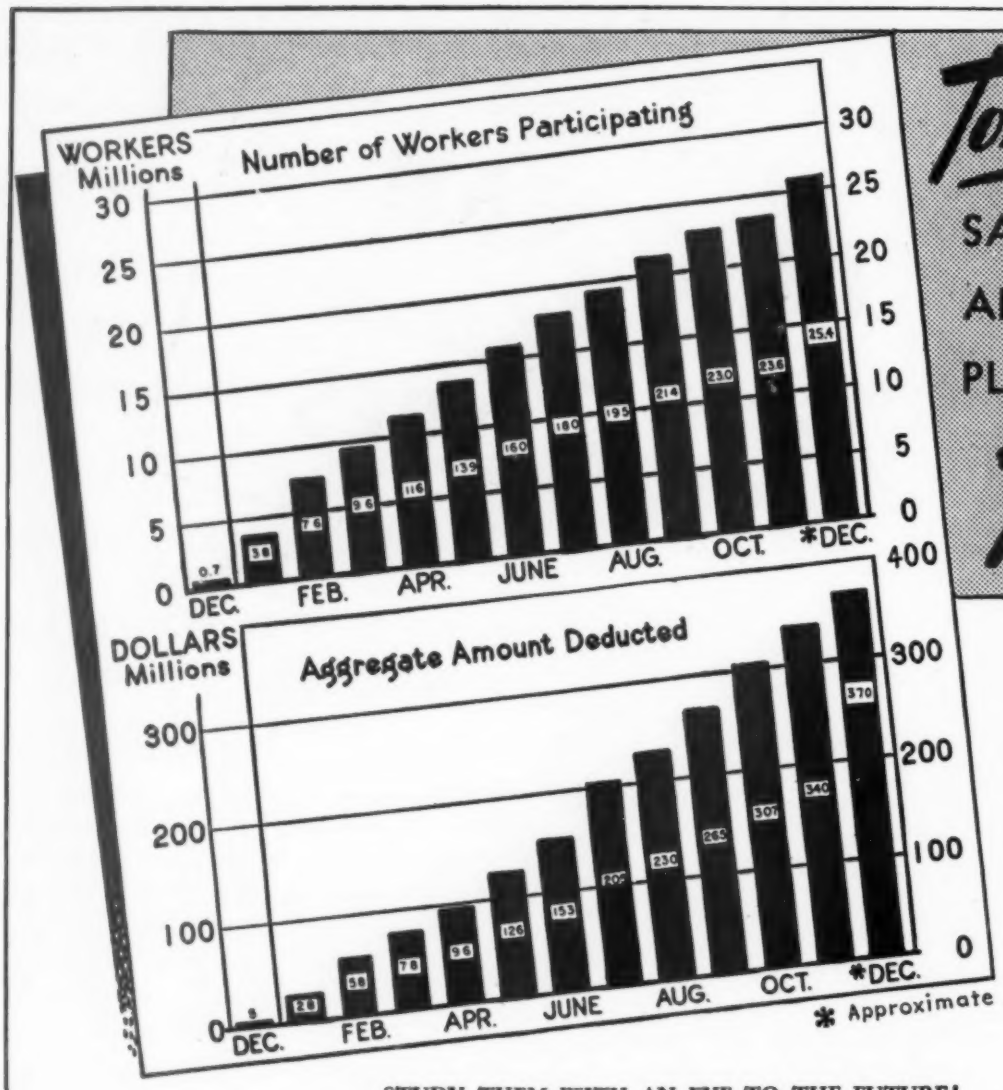

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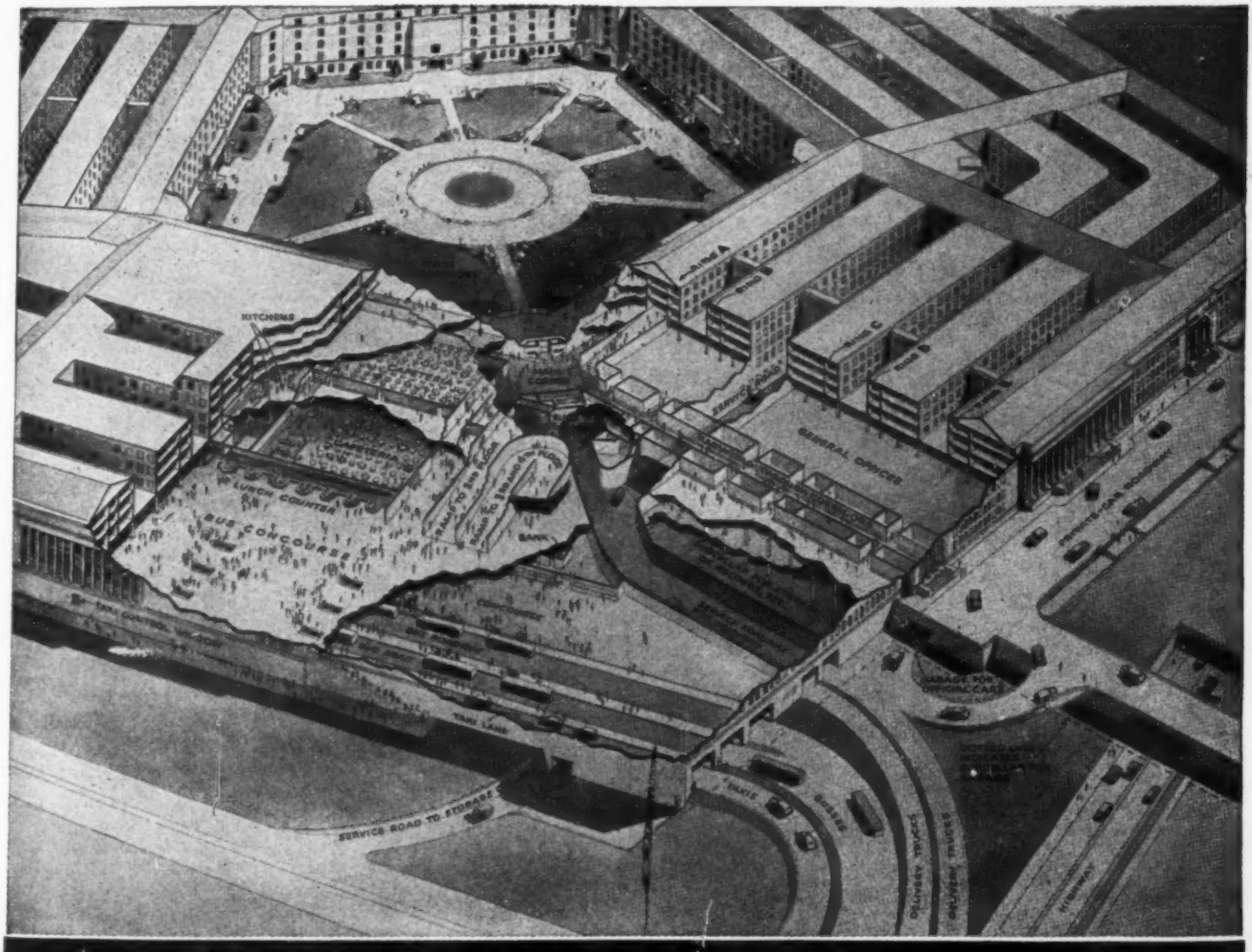

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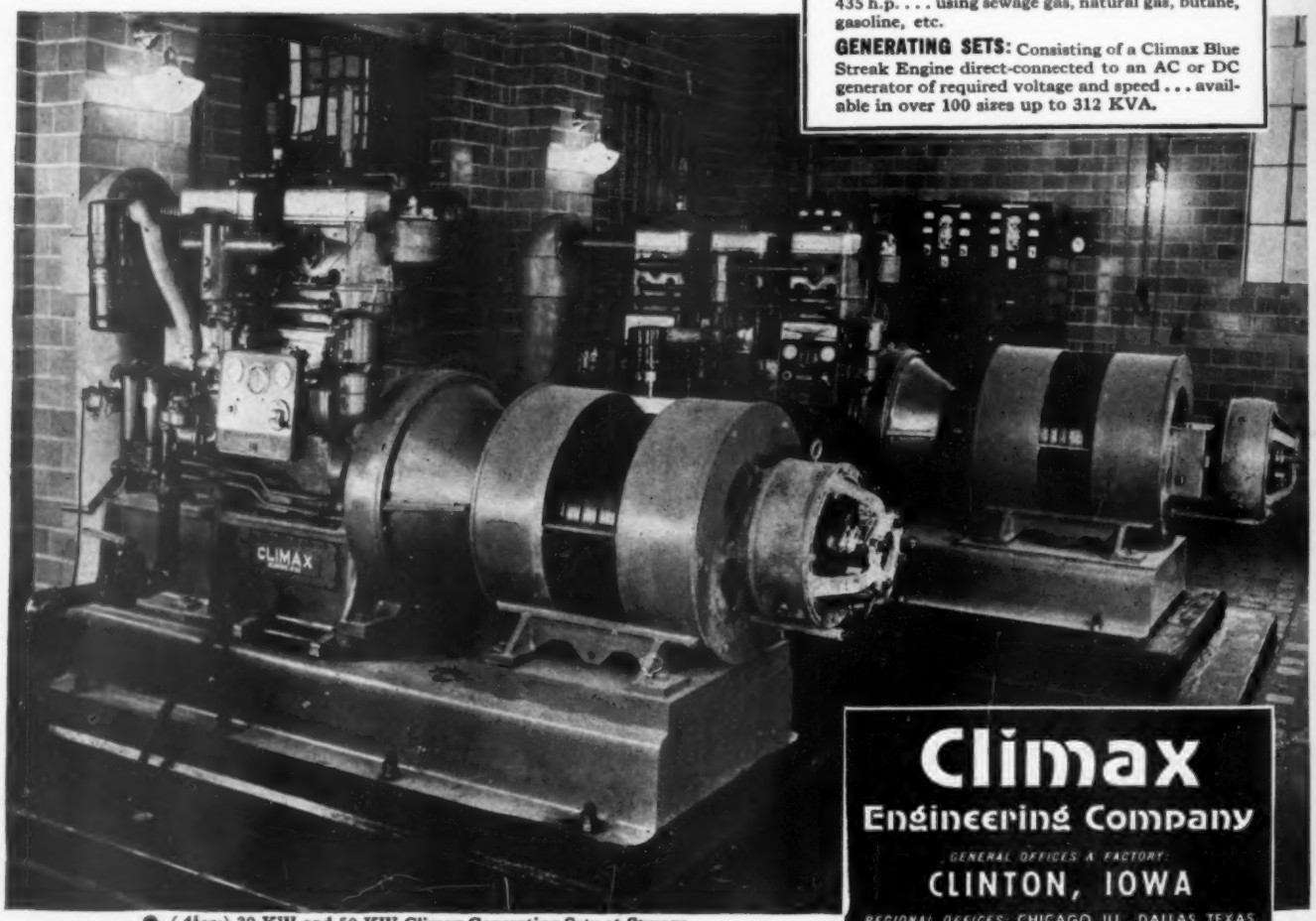

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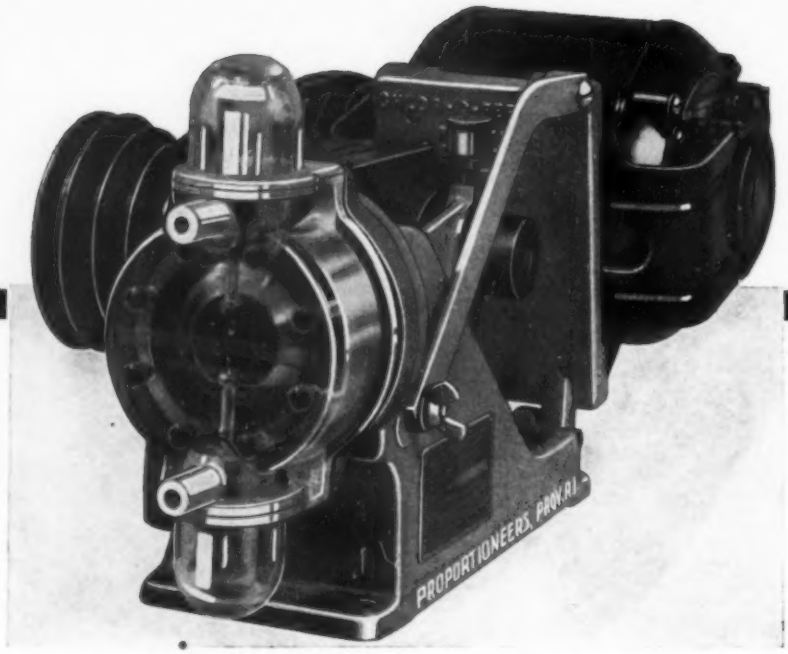

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"The Economics of Air-Diffuser Cleaning"
Is a description of the Cleveland method and equipment developed for cleaning air diffuser plates at the Easterly Activated Sludge Plant. The power economy resulting, and net benefits derived are set forth to give a picture of the dollar and cents side of effective diffuser media maintenance. The author is—
JOHN J. WIRTS, Supt.,
Easterly Treatment Works, Cleveland, Ohio.

"The Control of Corrosion"
Is a well rounded out article on a topic of which it is impossible to know too much and concerning which there seems that much is still to be learned. We are privileged to offer this discussion of corrosion and its control in water supply practice by one who has probably a longer contact with the corrosion problem than any other water supply engineer. He is our water treatment patriarch—
ROBERT SPURR WESTON,
Consulting Engineer, Boston, Mass.

"Packinghouse Waste Treatment Which Yields a Return"
Is one of the series of articles on industrial waste treatment which have been appearing in this magazine. This one tells of a process developed by Swift & Co.'s Research Laboratories that yields a product useful as stock feed to defray the costs of purification of protein rich packinghouse wastes. The authors—
CAPT. M. D. SANDERS and E. N. MORTENSON,
Chemical Engineering Division of Swift & Co.

"The Selection of Main Line Meters"
Is a contribution of one well qualified to discuss basic considerations to be taken into account in selecting main line meters for measurement and recording of flow of water and sewage. In this article the matter of over-all cost in metering constitutes a highly important and illuminating part of the author's analyses of typical metering problems and the right and wrong types of metering equipment for the job. An authority of long experience is—
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Builders—Providence, Inc., Providence, R. I.

"Sludge Bulking Control"
Is a recital of experience with mild chlorination of returned sludge, during a number of summers, for the purpose of controlling sludge bulking. The author is—
E. E. SMITH, Supt. of Water and Sewage,
Lima, Ohio.

"Rejuvenation of Water Mains"
Is an account by a superintendent of a water supply system which may be classified as small to medium in size. It tells of experiences with cleaning and cement lining in place of trouble giving mains in the system—those dead ended mains. His story constitutes a most convincing argument of the value of this scheme of putting an end to consumer complaints of rusty water and the solution of the question of fire supply pressures without main replacement at double to triple the cost. His argument is that *now* is the time of times to undertake rejuvenation of existing mains with noncritical cement linings, placed with a minimum of manpower required, and when there is not much of equivalent importance that water utility funds can be spent for. Those who read this revelation of the author will need be given no further reasons to watch for the story of—
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Is the interesting story of hardness precipitation by the plant Chara, which also performs another useful service in inhibiting algae growths. The report comes from—
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Is the invention of a plant superintendent of a simplified flow-meter for water and sewage plants. The author and inventor—
JOHN D. SLOUGH, Superintendent,
Water Works and Sewerage, Wellsville, N. Y.

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WATER WORKS & SEWERAGE

VOL. 90, No. 4 *A Gillette Publication* APRIL, 1943

CHLORINE—A CRITICAL MATERIAL SOLVES A CRITICAL PROBLEM

The Story of a Three-Year Battle to Re-establish the Design Capacity of a Vital Supply Line

By

L. A. JACKSON and W. A. MAYHAN

Manager Chemist

LITTLE ROCK MUNICIPAL WATER WORKS,

LITTLE ROCK, ARKANSAS

IN 1936 construction of a new source of water supply for the City of Little Rock, Arkansas, was begun. This included the construction of a rolled earthen dam across the Alum Fork River, impounding a lake of 14 billion gallons of water at a point approximately 33 miles west of Little Rock. [See cover picture.] This distant new source of supply was connected to the Purification Plant, located in Little Rock proper, by the construction of a 39-inch internal diameter, steel-cylinder, reinforced concrete pipe line.

Authors

L. A. Jackson *W. A. Mayhan*

Each pipe section is 16 feet long and weighs 4¼ to 4½ tons. The pipe consists of a welded steel cylinder with galvanized steel joint rings welded to its ends, a concrete lining approximately 1⅛ inches thick, and a concrete covering reinforced with a cage of spirally wound steel rods. The total wall thickness is approximately 4 inches. The joint was of the B&S type with a round rubber gasket, located in a groove on the spigot section.

The spill elevation of Lake Winona, the new source of supply, is 230 feet above the receiving basin elevation at the Filtration Plant in Little Rock, and the flow from the reservoir to the plant is wholly by gravity. At the time of construction no provision was made for sterilizing treatment at the lake end of the line. None was conceived as being justified at the time, for pollution was no

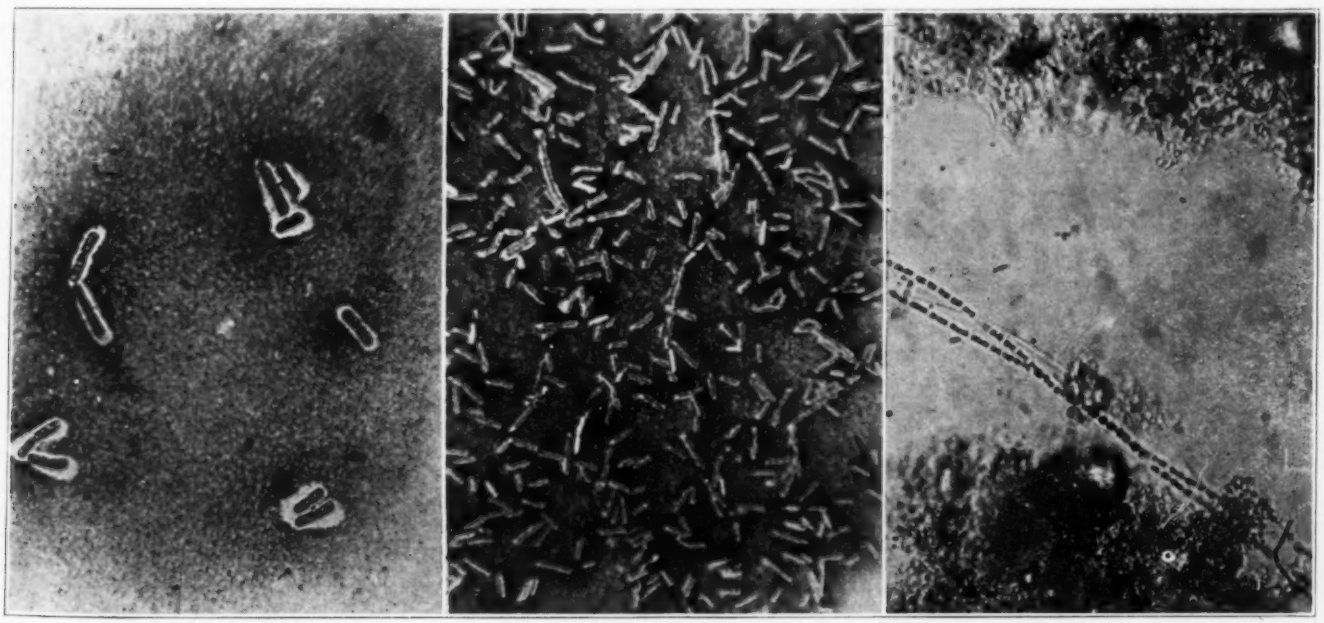


Plate I *Plate II* *Plate III*

Microphotographs of Organisms Found Predominating in Flow Impeding Slime on Pipe Interior Walls

Plate I and Plate II: Large and Small Gram Plus Capsulated Bacteria. Plate III: Crenothrix

problem and subsequent problems had not been foreseen.

New Pipe Line With "C" Value of 147 Had 25.32 MGD. Capacity—But Not for Long

In February, 1938, all construction work was completed.

The lake, having filled to overflowing in December of the preceding year, the new mountain supply was turned into the system. The designed capacity of the 39-inch raw water flow line was 25 m.g.d. In April, 1938, two months after the pipe line was put into service, it was tested to determine its actual maximum carrying capacity. This test revealed that the line would actually deliver 25.32 m.g.d., and that Hazen-Williams coefficient "C" for the entire line was 147.

No further tests were made on the line's carrying capacity until a year later (Feb. 23, 1939). A few months before this second test it had been noted that on opening the line wide, it did not deliver 25.32 m.g.d., but that the capacity was gradually dropping, and at the time of the second test, maximum delivery was only 20.38 m.g.d. and the average "C" for the entire line was found to have dropped to 120. Thus in the brief period of one year's operation the carrying capacity of the line was reduced 20 per cent. With the fear that we might wake up some morning and not be able to get enough flow through the line for our requirements, something had to be done quickly.

A portion of the line, near the reservoir, was immediately dewatered and inspected. It was found that the interior of the pipe was covered with a very dark, almost black, organic slime deposit or growth, which varied from a very thin film in some places to a heavy mat of more than ¼ inch thickness in others. The growth was rather heavily interspersed with iron oxide and appeared to have a jelly-like consistency, being easily removed by drawing bare fingers over it. (See Table I for analysis of Lake Winona water.)

Little Rock's 33 Mile Supply Line Under Construction

Chlorinating Station at Lake Winona Valve Control House

This station is fenced and guarded 24 hours per day by mountain men who know how to shoot. The area can be flooded with light by the throw of a series of switches.

One-Ton Chlorine Containers

Photograph shows how connections to containers and manifold gas line were protected against tampering before the station was guarded constantly. The valves in the container heads and manifold are inside the vault, the hinged covers to which can be padlocked down.

Samples of this deposit or growth were collected and numerous tests were made on it, both chemical and bacteriological, in the purification plant laboratory. Samples were also sent to the laboratory of Wallace & Tiernan Co. in Newark, N. J., where they were examined by Mr. E. S. Horning of that firm. It was found that three types of organisms predominated, namely, large, gram plus, encapsulated bacteria; a smaller form of gram plus encapsulated bacteria, and the iron bacterium, Crenothrix. Photomicrographs of these various organisms were made and are shown in Plates I, II and III.

A Trial With Chloramination Seemed Justified

The problem of removing this organic growth from the line was given very careful study. It was finally decided that the application of chlorine and ammonia at the head of the supply line presented the best available approach to the solution of this problem. Immediate steps were taken to provide treatment facilities at the lake. Due to the physical construction it was decided to install the treatment plant about 1,300 feet from the intake tower in the lake, utilizing in part a control valve house structure, located at this point. Facilities for the application of chlorine and ammonia were purchased and installed at a total cost of $15,000. No provision was made for treating the first 1,300 feet of line between the intake tower and the control valve house. This short stretch of line was of tunnel construction and we felt that periodic treatment of this short section would keep it clean.

The ammonia-chlorine treatment ("chloramination") was begun on June 2, 1939, at a treatment rate of 1.26 ppm. of chlorine and one-third as much ammonia. At the end of the first three weeks of treatment, the capacity of the line, as measured by the Venturi meter, had increased from 20.38 m.g.d. to 21.80 m.g.d., but no "C" determinations were, as yet, made on the line. During this 3 weeks' period the residual chlorine reaching the 33 mile distant Filtration Plant in the city remained fairly constant at 0.55 p.p.m.

Prior to starting the ammonia-chlorine treatment, the "C" value of the line had been determined twice, on February 23, 1939, and again on May 25, 1939. These determinations were carried out empirically, dividing the entire line into seven sections and determining the "C" value of each section. From these results the average "C" value for the entire line was then computed.

During the next 30 day period (July 1-31, 1939) the 1:3 ratio of ammonia to chlorine was changed to 1:6 without changing the chlorine dosage.

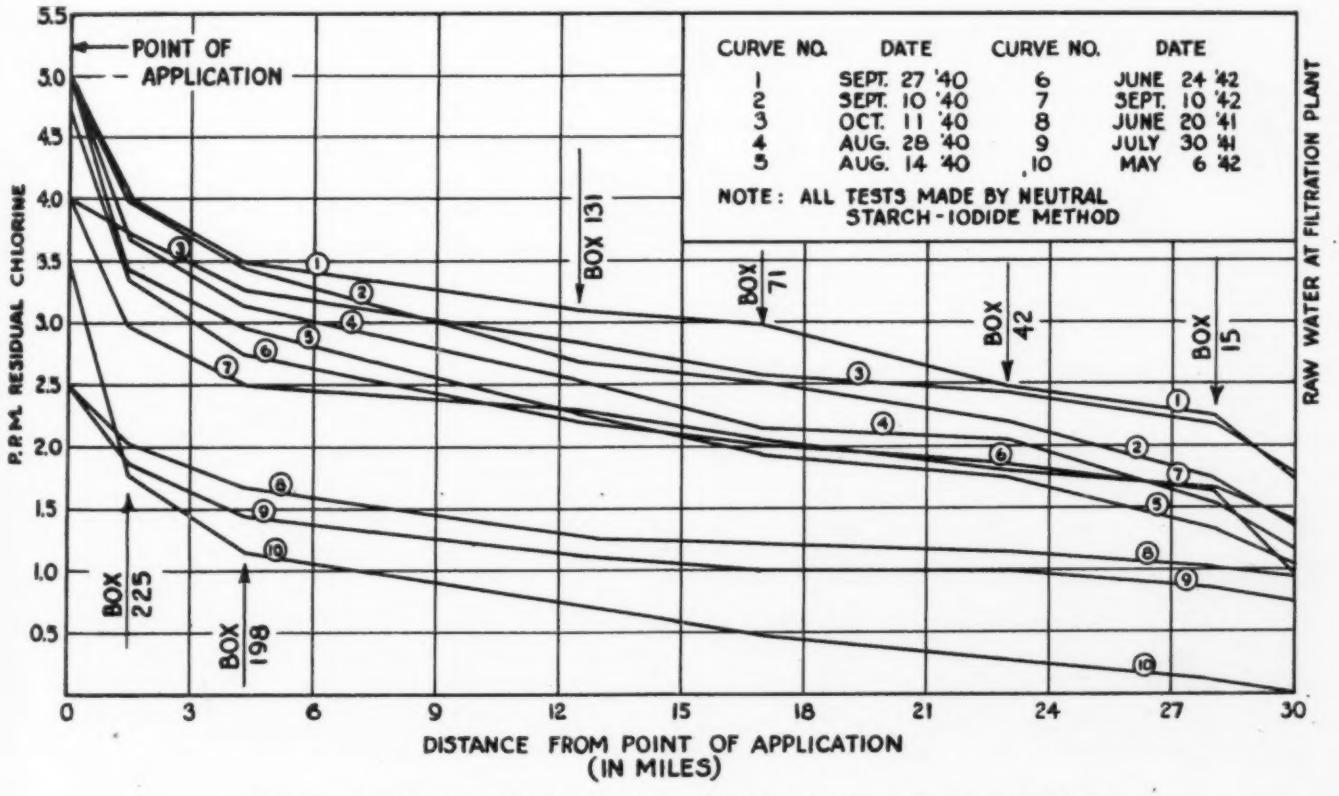


Chart I—"Break-point" Chlorination Test Results on 33 Mile Transmission Main

This did not affect the residual reaching the Filtration Plant, which remained at 0.55 p.p.m., but any further reduction in ammonia did result in a lower residual reaching the plant.

On July 31, 1939, friction coefficient determinations were made on the entire line under full flow conditions, and the "C" values for some sections showed noticeable improvement, the results being best nearest the point of chlorine application. The results of this and subsequent tests are shown in Table II.

Copper Sulphate Treatment Disappointing

At about this time (Aug. 1, 1939) a test on the 1,300 feet of line between Intake Tower and Control Valve House showed a "C" value of only 84. Since this section of line was not being treated with chlorine, the entire supply line was taken out of service, this section isolated, and treated heavily with copper sulphate and allowed to stand 48 hours in contact with the copper solution. [Here it is well to explain that an auxiliary reservoir floats on the supply line near the city, thus permitting holding the supply line out of service for considerable periods when necessary.] At the end of this time, the copper solution was thoroughly flushed out and the line put back in service, with the ammonia-chlorine treatment again being resumed. Subsequent tests on this section of the line showed no improvement due to the copper treatment.

Full flow tests were again made on the line on Aug. 11, 1939, and these indicated still further improvement in "C" values. At this time the chlorine dosage was increased to 1.60 p.p.m., with ammonia at 1:4 ratio.

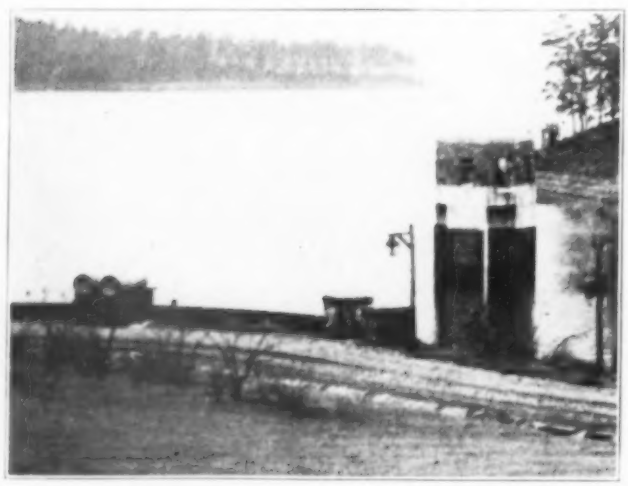
On Aug. 14, 1939, strong chlorinous odors developed at the filtration plant. The chlorine dosage was immediately reduced to 1.0 p.p.m. and the ammonia ratio raised to 1:3. The chlorinous odors gradually disappeared over a period of 2-3 weeks.

On Oct. 2, 1939, the 1,300-foot Intake Tower-to-Control Valve House section of line was again isolated and this time treated with 30 p.p.m. of chlorine for a period of 48 hours. At the end of this time the line was flushed and the original ammonia-chlorine treatment resumed.

"Break-point" Chlorination Decided Upon

On April 3, 1940, a full flow test was made on the entire line. The maximum capacity was found to have increased from 21.80 to 22.25 m.g.d. "C" tests on the 1,300-foot Intake Tower section showed great improvement. The "C" value for this section had been raised from 77 to 159. This indicated that straight chlorine treatment, in heavy concentration, should be highly effective in killing and dislodging the organic growth. It was, therefore, decided to discontinue the use of ammonia at the reservoir and to raise the chlorine dosage to "break-point" proportions. Laboratory tests had indicated the "break-point" of the raw lake water to be 3.5 p.p.m.

Break-point chlorination was begun on Aug. 5, 1940, using a chlorine dosage of 5.0 p.p.m. The residual reaching the filtration plant was, on the average, 1.0 p.p.m., the remaining 4.0 p.p.m. being dissipated in the line. At this time, tests were made at various points on the line to determine the chlorine residual present. The results of these and subsequent tests are shown in Chart I. Ammonia was still used in the purification processes, being applied to the already super-chlorinated water at the Filtration Plant at a 1:3 ratio, this ratio being based on the chlorine residual in the water arriving at the plant.



Intake Tower, Lake Winona

For temporary super-chlorination of tunnel section from tower to valve control house gas was fed direct from ton-containers through floating rubber hose line to the tower. The containers are seen in the lower left.

On Sept. 27, 1940, the chlorine dosage was reduced to 4.0 p.p.m., this reduction being occasioned by lower water temperatures and a lowered "break-point. ["Break-point" determinations have been made at various times during each year and have caried from a high of 3.5 p.p.m. in the summer to a low of 1.5 p.p.m. in the winter.]

Super-Super Chlorination Tried

Since the removal of the organic growth from the line was proceeding much slower than anticipated, at two different intervals during 1941 exceedingly heavy chlorine concentrations were employed for periods of 24 hours each. On these occasions, flow was reduced and the treatment rate was stepped up to 300-400 p.p.m., the heavily treated water being wasted into a creek near the Little Rock end of the line. The method used was to connect a battery of 4 one-ton chlorine containers into a large rubber hose manifold, which, in turn, was inserted into the pipe line through a pressure manhole near the reservoir. The flow through the line was kept at 10 m.g.d. during the time of treatment. At the end of the treatment the line was thoroughly flushed, put back into service and the original "break-point" treatment resumed.

On Oct. 21, 1940, a full-flow test was made on the line, the results of which indicated still further improvement in "C" values and maximum carrying capacity recorded since the beginning of the chlorine treatment.

On Oct. 27, 1940, the chlorine dosage was still further reduced to 3.0 p.p.m., and with few exceptions this treatment rate remained unchanged until Sept. 12, 1941, almost a year later. At this time it was increased to 3.5 p.p.m., where it remained until the end of 1941.

During the year 1941, four more full-flow tests were made on the line, each indicating still further slight increases in carrying capacity.

Flow tests, made on the line after these two superchlorination treatments, did not show any very great improvement, due to this type of treatment over and above the "break-point" dosage scheme.

Throughout the year of 1942 two full-flow tests on the line were made, the results still showing very slow improvement in maximum line capacity.

From January until June, 1942, the chlorine dosage was on the average 3.5 p.p.m. During the months of June, July and August the dosage

was kept at 4.5 p.p.m. Since September the chlorine treatment rate has been slowly reduced and at the present time is 2.5 p.p.m.

The experimental stage of this treatment has been passed and our present plan is to keep well on the upper side of the "break-point," making the necessary seasonal increases or decreases as the "break-point" value of the raw water changes.

TABLE I

Raw Water Analysis—Little Rock, Ark.

(Lake Winona)

Component	p.p.m.
Silica (SiO_2)	5.60
Iron and Aluminum Oxides (Fe_2O_3 and Al_2O_3)	0.43
Calcium (Ca)	3.77
Magnesium (Mg)	1.26
Sodium and Potassium (Na K as NA)	3.04
Bicarbonate (HCO_3)	14.64
Carbonate (CO_3)	0
Sulphate (SO_4)	2.07
Chloride (Cl)	5.00
Carbonate Hardness	15.00
Total Hardness	15.00
Total Dissolved Solids	26.00

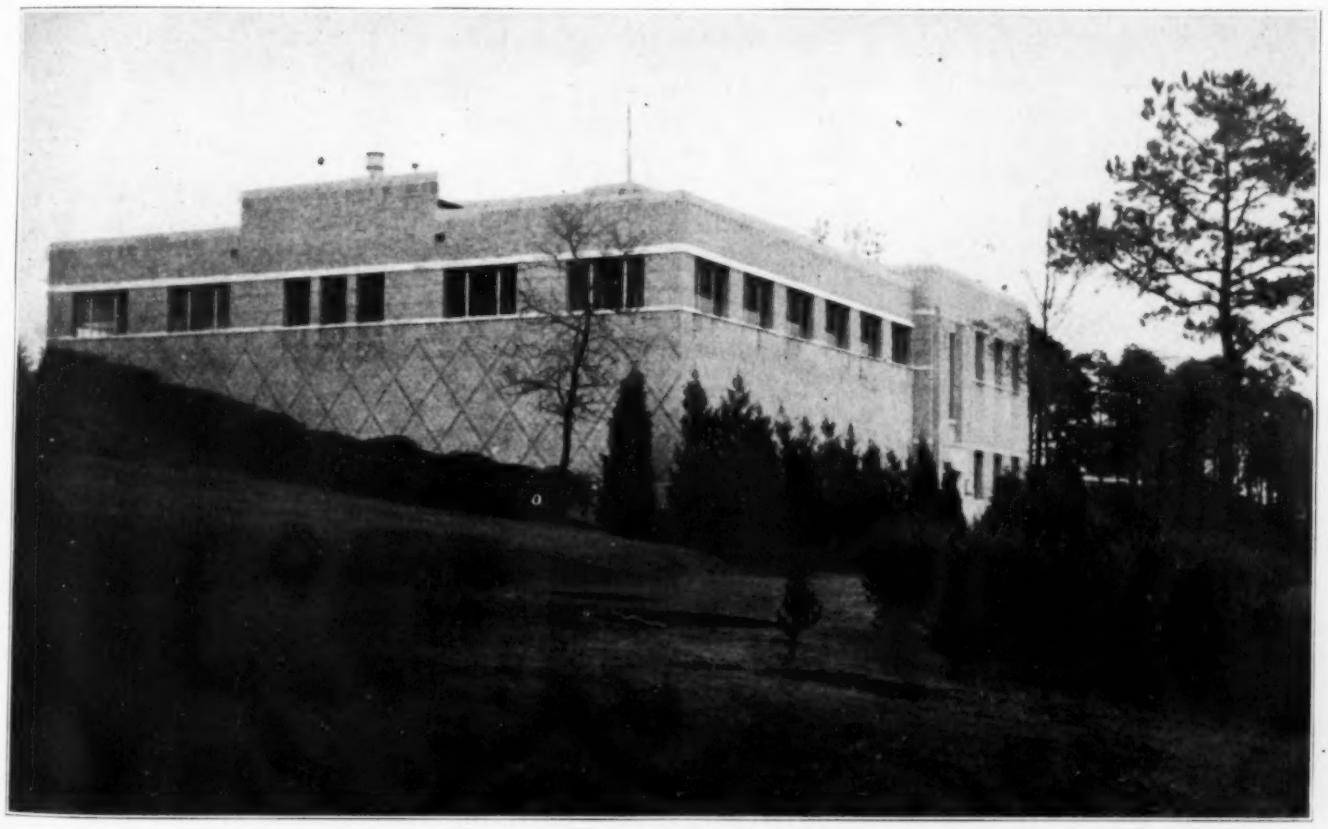
Other Advantages Noted for "Break-point" Chlorination

Aside from destroying the organic growth in the transmission line, "break-point" chlorination has proved of value to us in other ways. Since beginning this treatment, taste and odor flareups have been practically non-existent. We are assured a sterile water throughout the entire plant and lactose-fermenting organisms in the plant are a thing of the past. The initial chlorine application to the line at the reservoir, followed by ammoniation only at the filtration plant, allows us to carry residuals of 0.3 to 0.5 p.p.m. out into the distribution system. Ample chlorination equipment is maintained at the filtration plant but its use is seldom required except at such times that the chlorine equipment at the reservoir is out of service for repairs, etc. Chlorine residual tests are made every hour by the operators at the filtration plant, thus assuring maximum safety in event of failure of the chlorination equipment at the reservoir.

Throughout the three years that this pipe line has been treated, numerous other tests, aside from those mentioned above, have been carried out. Probably the most significant of these were "Loss-on-Ignition" tests. This test was made on samples scraped from the interior wall of the line just prior to beginning the treatment and again after four months of treatment. The first sample showed a loss-on-ignition of 31.10 per cent and the sample collected four months later 20.61 per cent loss-on-ignition. During this four months' period the color of the organic growth changed from a red-dish-black to a dirty grey-brown color.

Air-Scrubbing Possibilities

One interesting fact that was discovered by accident is the effect of a mixture of air and water in the flow line. Air was injected into the line in an attempt to airlock the pipe and thus build up pressure on that portion of the line ahead of the air. Although this was done in connection with another problem, it was noted that immediately after the addition of the air to the pipe line, numerous quantities of organic refuse were dislodged from the interior of the pipe and were carried into the plant. The picture of air and water creates turbulence, which apparently is very effective in scouring the organic matter from the pipe



Little Rock's 8 M.G.D. Filter Plant

Strategically located on a high hill-top within the city and in sight of the State Capitol.

TABLE II

Hazen-Williams Coef. "C" Determination—39" Raw Water Supply Line

Orig. "C" when installed = 147 for entire line
Original Maximum Flow = 25.32 M.G.D.

Date	Intake Tower to Control House	Box 226	Box 198	Box 141	Box 71	Box 42	Box 15 (Junction)	Avg. "C" Ent. Line	Maximum Flow in M.G.D.
2-23-39.....	...	...	98	113	121	137	131	120	20.38
5-25-39.....	...	...	88	120	123	136	131	120	20.38
6- 2-39.....	Chloramine Treatment Started—1.0 ppm. chlorine plus 0.33 p.p.m. ammonia								
7-31-39.....	84	128	110	122		133	135	128	21.80
8-11-39.....	82	128	113	121	128	140	137	128	21.80
9-25-39.....	77	119	113	125	125	142	136	129	21.80
10- 2-39.....	Treated Intake Tower-Control House Line section with 30 ppm. chlorine (from Oct. 2-5th)								
4- 3-40.....	159	108	118	129	129	143	145	133	22.20
8- 5-40.....	144	117	117	129	127	133	139	128	22.20
8- 5-40.....	Ammonia discontinued; Super-chlorination begun. Treatment Rate—5.0 ppm.								
10-21-40.....	127	122	123	132	129	135	139	132	22.50
6- 5-41.....	116	121	120	130	134	135	141	132	22.80
6-21-41.....	Treated entire 39" line from Control House to Box 15 with 100 ppm. dosage of chlorine (12 hr. contact)								
6-27-41.....	107	125	121	132	135	136	142	134	23.03
8-18-41.....	118	120	120	134	135	137	142	134	22.89
10- 1-41.....	128	124	127	135	134	137	143	136	22.89
10-18-41.....	Treated entire 39" line from Control House to Box 15 with 100 ppm. dosage of chlorine (12 hr. contact)								
1-22-42.....	120.5	118.5	127	140	132	141	145	137	23.40
4- 6-42.....	139	118	124	136	137	144	146	137.6	23.70
11-12-42.....	108.6	130.3	128.1	138.6	133.7	139.1	144.5	137.0	23.5

interior. We are considering utilizing this process for the purpose of dislodging more of the dead organic matter from the pipe line.

Summary

In one year of operation the capacity of a vital flow line was reduced 20 per cent by organic growth which could have been prevented had sterilization facilities at the head of the supply line been included in the original design.

Ammonia-chlorine treatment showed small and slow improvement and, therefore, was discontinued. From our three years' experience we are saisfied that "break-point" superchlorination has proven the most effective treatment and will probably be continued in varying degrees until the designed capacity of the line is completely restored.

Another Water Purification Man Becomes Dep't Head

Baxter Wade Made Supt., Jackson, Miss.

We are always happy to hear of promotions of chemists and superintendents of filtration to the position of department head.

We have advice from Rex B. Magee, Genl. Manager of Jackson, Miss., that Baxter F. Wade has been promoted from Superintendent of Filtration to General Superintendent, succeeding the late John H. Fewell.

Mr. Wade is a native of Roxboro, N. C., a product of the University

Baxter Wade

of North Carolina—one of Dean Baity's men. A 1929 graduate in Civil Engineering, he took the graduate courses in Sanitary and Public Health Engineering. Before going to Jackson to assume charge of water-works betterments and expansion, he had been connected with the water purification and sewage treatment plants of Raleigh and Charlotte, N. C.

North Carolina is proud of Baxter Wade and Jackson is fortunate to have him in charge of its water works.

"Bud" Dimick, Hero, Receives Silver Star Medal

On the 8th of March to Corporal Arthur J. Dimick, U. S. Marines, was presented the Silver Star Medal with the following citation:

"For conspicuous gallantry and intrepidity in action against the enemy in the British Solomon Islands on November 3, 1942. During the attack on hostile positions at Gaudalcanal when the advance of the company to which he was attached was threatened by close range fire from an enemy 37 mm gun, Corporal Dimick, with complete disregard for his own safety, in the company of two other marines, rushed forward in the face of heavy enemy fire, captured the gun by destroying the hostile gun crew, and placed that weapon out of action, thereby permitting the remainder of his company to carry its objective without undue losses."

Signed: W. F. HALSEY,
Admiral, U. S. Navy.

Many of our readers will remember Corporal "Bud" Dimick as a former representative of Chemical Industrial Sales Division of the W. Va. Pulp and Paper Co. He was attached to the Cleveland office of the company up until his enlistment in December, 1941. During his recent furlough back in this country he was tendered a special hero-coming reception at Industrial's New York office.

Corp. A. J. Dimick

THE SHREVEPORT HYDRANT

Features Rubber Cushioned Duplex Valve Possessing Several Advantages

By T. L. AMISS
Superintendent and Engineer
DEPT. OF WATER & SEWERAGE.
SHREVEPORT, LA.

THE writer has been invited to describe for publication in WATER WORKS AND SEWERAGE the description of what is considered to be something of an improved valve for fire hydrants developed here in the Shreveport Dep't of Water and Sewerage. This novel valve is the invention of our maintenance foreman, E. J. Hollifield, with the writer assisting in the design. A number of these improved hydrants have been in service on our Shreveport system for some time. And, more recently, have also been manufactured in Shreveport for other municipalities which have likewise found them to offer the several advantages herein enumerated.

The Author and Co-Inventor

Purpose and Effect of The New Design

The principal purposes and effects of the new design, which features the double gated duplex valve, are:

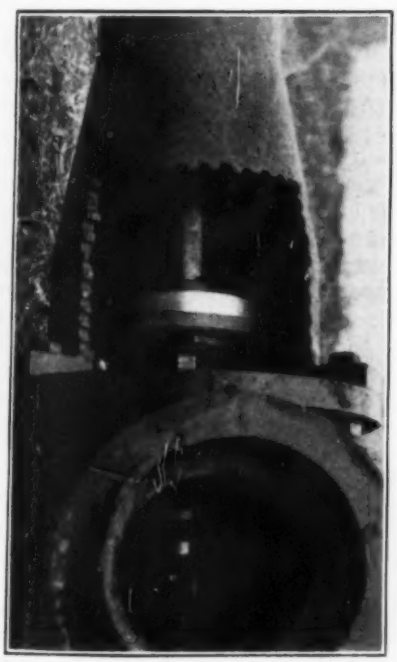
1—To insure against the loss of water and property damage if the hydrant barrel is broken.

2—The ability to overhaul the hydrant, including work on the operating valve gasket, without cutting the main out of service or closing the hydrant stub valve.

3—Relief of pressure on the operating valve.

4—Ability to close the operating valve on reduced pressure (in fact, hardly perceptible pressure) assuring easy complete shut-offs and longer operating life for the valve, stem, etc.

5—The non-necessity for valves on hydrant branches.



A Poor Picture Taken to Show the Lower Screw Bearing Now a Part of the 90° Shoe Casting.

Double Gated Design

All of the above is made possible because of the double or duplex gate which permits the lower gate to close *with the pressure behind it* and slightly in advance of the closure of the upper or operating gate. The lower gate is cushioned by a rubber bushing (see cross sectional drawing) which in nowise interferes with the complete closure of the operating upper gate. In brief—instead of having a single gate there are two gates synchronized to effect the double gated operation, the lower gate making a drip tight closing with the main pressure behind it assisting, while the operating valve then easily goes to complete closure against the materially lessened pressure—in fact, little if any pressure.

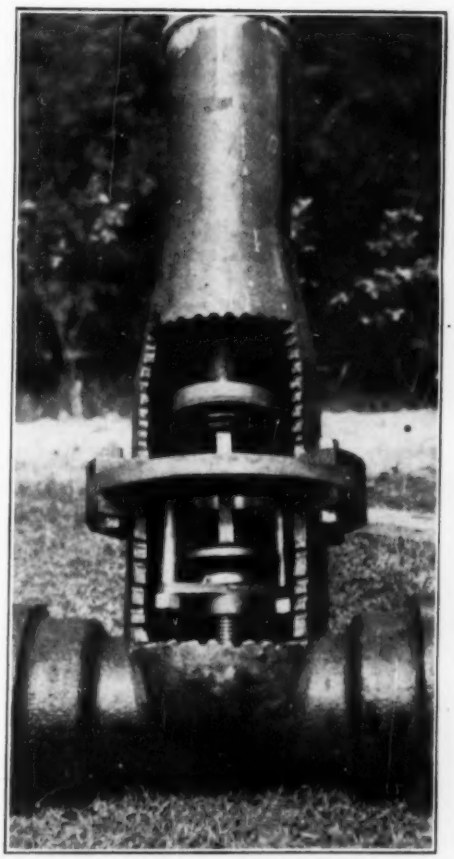
Advantages in Maintenance And Repairs

All movable parts of the hydrant above the flange, including the stem, upper valve, barrel—in fact, the entire upper part of the hydrant—can be removed without taking the main out of service. The stem, gate and drill, can be removed through the barrel also.

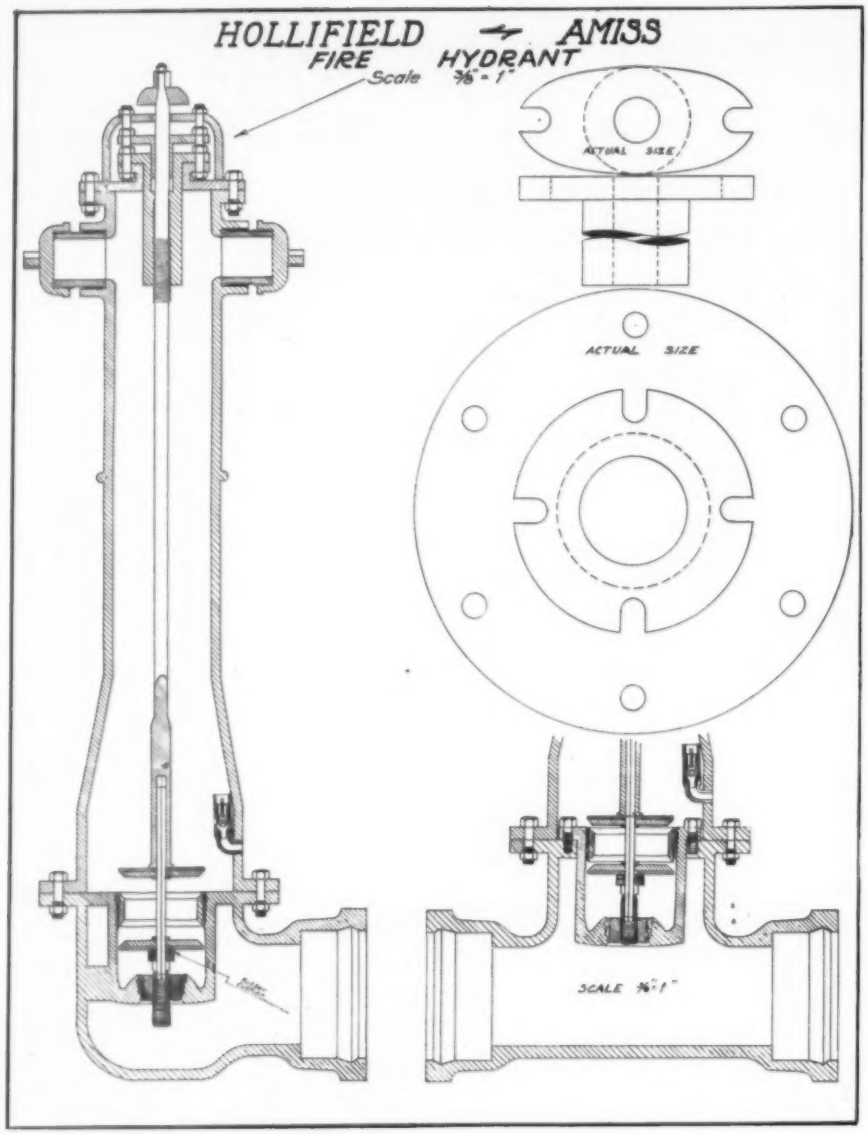
Any shoe or bottom can be had to suit conditions. In our case, all mains are laid in the sidewalk; consequently we install hydrants directly over the mains, the through way of the tee being left free for main cleanings. (See sectional drawings.)

However, we also use the 90 degree hub flange ells for offset hydrant settings. But because of the double gated valve we no longer consider it necessary to install the customary shut off valve in the hydrant branch.

The Shreveport hydrant is equipped with an automatic drip (see sectional drawings) which operates by pressure and can be removed for inspection, repairs, or cleaning, with the main in service.



Cutaway of Shreveport Hydrant, Showing the Featured Duplex Valve.



Cross Sectional Drawing of Newest Model of Shreveport Hydrant.

Latest Design of 90° Shoe with Lower Screw Bearing a Part of the Casting; Also the Valve Carrier Web Casting for Tee Bottoms. These Castings Eliminate the Bolts and Follow Flange Showing in the Photograph.

One Hundred in Service

There are now about one hundred (100) of these improved hydrants in service on the Shreveport system and others. The accompanying photograph gives a good view of the duplex valve with its lower and upper (operating) gate, below and above the flange, which come to complete closure practically simultaneously, except that the lower gate closes off the pressure fractionally ahead of complete closure of the operating gate.

While this photograph pictures one of the earlier designs, the line drawings of the more recent designs reveal that the bolts and follow flange have been discarded. Instead special shoe and tee castings have been developed which supply the lower screw bearings without in any manner impeding water flow or reducing pressure through friction. In fact the Shreveport hydrants having these special shoes show a lower friction loss than is permitted in A.W.W.A. Specifications for Fire Hydrants.

If this somewhat sketchy description of the "Shreveport Hydrant" leaves certain questions in the mind of the reader, the writer will be glad to attempt to answer them, and explain in more detail if necessary.

New Jersey Section Holding Regional Meetings*

The Chairman
Wm. G. Banks, Div. Engr., Division of Water, Newark, N. J.

In order to obtain a maximum attendance of members, under war time travel restrictions, the New Jersey section A.W.W.A. has decided to hold several one day meetings at widely dispersed locations. The meeting in Paterson, **March 12th,** constituted the first such regional meeting and was termed the winter meeting of the section.

More than one hundred members registered for the noon luncheon. The brief program included a sound motion picture, a stimulating address by Harry E. Jordan, A.W.W.A. secretary, and round table discussion of plant problems. The meeting was adjourned in sufficient time to enable those attending to be back on the job by nightfall.

Charles J. Alfke, President, The Hackensack Water Company, presented a motion picture "As The Gentle Rain." This film is an excellent example of explaining to the general public the development and purification of a water supply. Color photography is used throughout and a running commentary adds both interest and instruction. Such films should find a wide demand among civic groups and should contribute to the building of good public relations.

Mr. Jordan spoke on "The War Manpower Commissions Ruling As It Affects the Water Works Man," noting that there are 3,000 job designations and that the American Water Works Association has supplied needed information regarding essential water-works employees. For critically needed men, all employers should request deferment (on form 42B). Such applications should not be overdone and the employer must be prepared to defend this need with the selective service board. In the age range of 18 to 38, ten out of each fourteen men must be in military service to meet quota requirements. Recent information indicates that it is proper to request the discharge of trained men, if over the age of thirty-eight, to assume jobs in the water field. Mr. Jordan also discussed the new WPB utilities order U-1, recently mailed to all A.W.W.A. members.

*A report by Harry Faber, Assoc. Editor.

N. J. SEWAGE WORKS ASSOCIATION HOLDS VICTORY COUNCIL

Address by Maury Maverick, WPB, Assures Effective Administration of Maintenance and Repair Needs for Sewage Plants

By HARRY A. FABER*
Editorial Associate

The President
H. Van der Vleit
Supt. Pub. Wks.
Maywood, N. J.

THE meeting of the New Jersey Sewage Works Association in Trenton on February 25 and 26 provided a timely and profitable program for 275 members and guests. Several technical papers described accomplishments in solving wartime problems of plant operation, while new research information was made available by others. A round table discussion supplied answers to specific questions and two speakers discussed the present and future status of sewage treatment plants.

The Water and Sewage Manufacturers' Association provided the ex-

No. 1 Host
Harry P. Croft
Chief
Engineering Div.
N. J. Dept. Health

cellent annual dinner and entertainment feature. Under their auspices, too, was the space devoted to exhibits—this year many booths displayed only a name and a few pamphlets, but the taking of exhibit space did prove the interest and support of the manufacturers' group.

*Research Chemist, The Chlorine Institute, Inc., New York, N. Y.

Maverick Address an Outstanding Feature

As a direct result of resolutions passed by the Executive Boards of the A. S. C. E. and of the Sewage Works Federation (reported in detail in WATER WORKS AND SEWERAGE, February, 1943) calling upon the War Production Board to establish an improved method of handling sewerage requirements of the nation, the New Jersey Association became host to Maury Maverick, head of the WPB Governmental Division.

Effect of these resolutions was the

The Secretary
John R. Downes
Supt. of Treatment
Plainfield, N. J.

Ex-Treasurer
Paul Militor, Jr.
Somewhere in
*Alaska**

[**Now in the U.S.N. "See-bees," Paul, for several years treasurer of the Association, is "on leave," while brother Ed. Molitor carries on as treasurer for the duration.*]

appointment by Mr. Maverick of three engineers to serve as a board of consultants:

Linn H. Enslow, Chairman, Sanitary Engineering Division, A. S. C. E.

William Raisch, Chairman, Sanitation Group, A. S. M. E.

George J. Schroepfer, President, Sewage Works Federation.

These consultants held several conferences in Washington with Mr. Maverick and his staff to clarify the relation between sanitation and public health and to determine the best methods of allocating critical materials for plant needs. In order to make direct contact between his Division and the sewage associations, Director Maverick arranged to be present at the New Jersey meeting and deliver a personal message.

1st Vice Pres.
John W. Collom
City Engineer
Bordentown, N. J.

Mr. Maverick, former mayor of San Antonio, Texas, and Congressman from his home state, in his excellent speech pointed out that it had been decided to establish a special Sewerage Section within the Governmental Division and place in charge of it a practical sewage works engineer with experience, reputation and administrative ability.

[Since this report was written, A. M. Rawn, General Manager and Chief Engineer of the Los Angeles County Sanitation District, has accepted appointment as Chief of the new Sewerage and Sanitation Section and reports in Washington for duty on April 12, as announced elsewhere in this issue. Also, Mr. Maverick's speech is being printed elsewhere in this issue and deserves careful reading by all interested in sewage disposal and sanitation.—Ed.]

No. 1 Guest
Maury Maverick
Director
Gov't'l Division
W.P.B.

Officers Retained for Two Year Term

Present officers were elected in 1942 to serve for two years and with the exception of the treasurer will continue through 1943. Paul Molitor, previous secretary, is now in active service; his brother, Edward Molitor, has been appointed to take over this position. Officers are:

President
Henry Van der Vleit
Maywood, N. J.

First Vice-President
John Collom
Bordentown, N. J.

Second Vice-President
L. J. Fontenelli
Rahway, N. J.

Secretary
John R. Downes
Plainfield, N. J.

Treasurer
Edward P. Molitor
Chatham, N. J.

The Nominating Committee proposed a list of new members for the Executive Committee and they were elected to serve for varying terms:

S. R. Probasco, 1 year.
M. S. Kachorsky, 1 year.
S. A. Kowalchik, 2 years.
P. N. Daniels, 3 years.
J. H. Simmerman, 3 years.

In the business meeting it was announced that plans have been made for the secretary to maintain a complete list of those association members in war services. The executive committee has decided that all on this list will be maintained as active members for the duration without payment of dues.

Organization for Post-War Waste Treatment Plants

C. J. Velz, Water Consultant, National Resources Planning Board, gave an especially stimulating discussion of **"Practical Planning for Pollution Abatement."** He pointed out that the construction of needed public works, which are now being deferred because of manpower and materials scarcity, obviously offers a natural cushion to absorb a part of the shock of demobilization. The challenge is whether we will wait until the hour is upon us and drift into a hit or miss proposition, or we will do some practical planning now to have ready plans and specifications for a well coordinated pollution abatement program.

There will be keen competition for the taxpayer's dollar. Those public works programs well conceived and planned will have priority, and rightly so. In various fields such preparation is already under way or well advanced. But pollution abatement projects are at a disadvantage because they require an unusual amount of preliminary study and investigation. An outstanding problem is that of industrial waste treatment. To consider municipal sewage and industrial waste separately is to double the task and increase the cost of pollution abatement.

W.P.B. Representatives
(From the Governmental Division)
Henry Evans, Field Representative
Bernard Lamb, Prin. Asst. to the Director
Stanley Pinel, Sanitary Engineer
(Just in case the Director didn't have all of the answers, this staff trio were on hand)

"Wheel-Horse" Chairmen

L. J. Fontenelli
Supt., Treat. Wks.
Rahway, N. J.
(Program chairm'n and N. J. S. W. A.'s youngest V.-Pres.)

P. N. Daniels
Supt., Treat. Wks.
Trenton, N. J.
(Arrangements chrm. and inventor of the "speechless dinner")

Mr. Velz pointed out that as a straight business proposition both industry and municipality will profit by combining their problem, equitably sharing capital and operating costs. Should state or federal grants-in-aid become available for construction of pollution abatement works, industries thus integrated will automatically participate in such aid. If this problem is to be faced realistically we must know where the problems are, industry by industry, city by city, and drainage area by drainage area. Surveys must be made to determine the character, volume, strength of wastes, and type of treatment. Where economy of construction and operation will show an advantage for joint works between adjoining municipalities, such integration should be developed.

Neither local nor federal agencies alone can carry on such developmental work. The National Resources Planning Board has already established a sanitation subcommittee for the New York-New Jersey Costal and Lower Hudson Drainage Basin. Practical planning is well under way and may be expected to realize the objective of coordinated construction programs.

Manufacturers' "Brass Hats"

Dan S. McAfee
Gen'l Manager
The Dorr Co.
New York

W. 'Bart' Marshall
Mgr. San. Sales
Chain-Belt Co.
Milwaukee

(McAfee is President of the Water and Sewage Works Mfrs., Association and Marshall is chairman of the Executive Committee of the Sewerage Division of the Association)

Plant Operators Serve Public Health Needs

Major John H. Brewster, Sanitary Engineer, USPHS (R), Second Civilian Defense Region, presented a paper titled **"The Sewage Plant Operator's Place in the War and Civilian Defense."** When damage is caused by enemy action, sewage utilities must be responsible for two important functions: the restoration of sewerage facilities and the protection of civilian health during that period. Sewage systems are not ordinarily well prepared with repair crews and this responsibility should be shared by state and local groups.

There is grave danger that both sewers and water mains would be fractured by bombs, and that sewage will be drawn into valved off water mains by back siphonage. All sewer breaks should be suspected until it is proved the water system has not been contaminated. The discharge of raw sewage into streams creates a potential danger to downstream waters and may menace public health. Information from war areas proves that failure of water supplies creates a serious condition in that water carriage of wastes is no longer possible.

Advice of a sanitary expert should be included in local defense planning to protect health and property. Detailed maps of sewerage systems should be available, with

copies duplicated in several locations. Storm sewers and private industrial sewers might even be utilized for emergency diversion of sewage. Detailed inventories of repair equipment location, including that owned by contractors, should be prepared.

Treatment plant damage will probably be accidental but power failure must be expected. An attempt should be made to continue effluent chlorination as a protective measure. Major Brewster emphasized that dry collection of wastes must be instituted if sewer systems cannot function. He exhibited a paper container designed for this purpose and pointed out that it could be disposed of by individual householders or by a scavenger system. Community privies or latrines might be installed as emergency facilities.

These points are well covered in Engineering Bulletin No. 2, obtainable from State Water Coordinators.

Technical Papers

"Effects of War Activities on the Operation of the New Brunswick Sewage Treatment Plant," by Sol Seid, Superintendent, New Brunswick, N. J.

This chemical treatment plant, designed for an average capacity of 9 mgd. and peak flows of 13 mgd., was placed in operation during March, 1937. A half million dollar project, it includes three pumping stations and the treatment plant, which is equipped with flocculators, chemical feed units, heated digesters, and vacuum filters. The original population design was for 40,700 persons.

Since 1941 larger flows of industrial washes have seriously increased operating problems. Flows are frequently in excess of hydraulic capacity and certain units are inadequate. There is a great need for standby and reserve equipment, and no such units are provided. Excessively strong industrial wastes create special treatment problems.

Work totaling $40,000 is now under way. Piping alterations, improvement in chemical feeding equipment, overhaul and repair jobs will increase plant efficiency. The industrial waste problem is receiving intensive study and two solutions (separate treatment and disposal, pretreatment and disposal with municipal sewage) are being evaluated.

Elson T. Killam, Hydraulic and Sanitary Engineer, New York, discussed this paper. He pointed out that the chemical treatment process has proven flexible and efficient under the very difficult conditions which obtain. The variations from pH 2.8 to pH 12.0 alone would prove fatal to a biological process.

Speakers

Prof. C. J. Velz, Head Civil Engr. Dept. Manhattan College, N. Y. City
C. George Andersen, Supt. of Sewerage Rockwell Center (L. I.), New York
Albert B. Kozma, Supt. of Treatment Joint Wks., Carlstadt and Rutherford, N. J.

"Repairs to a Methane Gas Holder," by C. George Anderson, Superintendent, Rockville Centre, N. Y.

Program Committee

Arthur F. Lehmann, Superintendent Hackensack, N. J.
Edw. P. Decker, Manager Elizabeth Valley Joint Com., Newark, N. J.
John Hood, Supt. of Treatment Ridgewood, N. J.

This paper was presented by Mr. Anderson at the meeting of the New York Sewage Works Assn. in January and was reviewed in a WATER WORKS AND SEWERAGE report in the March, 1943, issue.

Programmers

Dr. H. W. Gehm, Associate N. J. Water & Sew. Exp. Sta., N. Brunswick
Elson T. Killam, Consulting Engineer New York, N. Y.
Edw. F. Shissler, Supt. Public Works Haddon Heights, N. J.

"Operation of the New Milford Sewage Treatment Plant," by James Entwistle, Jr., Superintendent.

Until 1937 the 4,200 population of this town were served by individual cesspool and septic tank installations. The present sprinkling filter plant was built under a WPA grant and now treats a flow of 367,000 mgd. It includes primary and secondary settling tanks, heated digesters, and a chlorine contact tank. Digested sludge is dried on open sludge beds and is utilized by many residents as conditioner for lawns and gardens.

Flooding of filters during the summer for control of psychoda flies has proven successful. This is practiced for a 24-36 hour period each two weeks. A well on the plant grounds supplies water for flushing and for chlorinator operation. Total cost of operation during 1942 was $4,800.

"Operation of the Two Stage Digestion Process at the Rutherford Joint Meeting Sewage Treatment Plant," by Albert B. Kozma, Superintendent.

By means of slides, Mr. Kozma illustrated the design of the Dorr 2 stage digestion system provided at this plant. Each unit is equipped with a floating cover, one for gas storage and one to equalize pressure on the system. Gasification is 85% complete in the first stage.

After each pumping of sludge to the first digester, a turbo-mixer in the top of that unit is operated to mix sludge and prevent scum. Sludge is pumped from the first to the second digester and all sludge for drying is drawn from the second digester. Per capita production of gas averages 2 cu. ft., but one-quarter of this high yield is due to industrial wastes.

It has been found advantageous to pump very heavy sludge from the primary settling tank 3 times daily and from the secondary settling tank once daily. The second stage digester is heated only in very cold weather to prevent freezing of the floating cover. Control of operations is readily accomplished by regular determinations of carbon dioxide content of the gas, and foaming troubles have been avoided by maintaining a carbon dioxide content under forty per cent.

"Modifications and Operation of the Bergenfield - Dumont Sewage Treatment Plant," by John Duane, superintendent.

No industrial waste is received at this joint treatment plant from either borough. The original plant included septic tanks, dosing equipment, and five acres of sand filters. Plant effluent discharges to a small brook which flows through several towns and eventually to a mill pond. The brook receives street drainage and a high solids content during rain or runoff periods. These solids

Frank Mowrey
Chief Operator
Barrington, N. J.
and
Tom Weatherby
Operator
Oaklyn, N. J.

A. J. Gadomski
Operator
Perth Amboy, N. J.
and
Kermit De Voe
Supt.
South River, N. J.

Bill Sowdon
Sales Engineer
and
Lee Chamberlain
Eastern Mgr.
Amer. Well Wks.
Aurora, Ill.

Sam Probasco
City Engineer
Burlington, N. J.
and
"Dick" Wagner
Pres.
Zeolite Chem. Co.
Medford, N. J.

Ed. Bender
Chief Engr.
and
John Burton
Sales Engr.
Roberts Filter Co.
Darby, Pa.

(about 50% volatile) settle in the pond and digest during the summer months with the production of offensive gas and scum.

The treatment plant is located within 200 feet of residences which have full view of plant operations. Any disturbances, such as pumping tanks for repairs, discharge of undigested sludge to drying beds, etc., resulted in immediate complaints. The first improvement was brought about in 1928 by enlarging the sludge bed capacity and constructing two greenhouses to cover all beds. But a higher sewage flow, due to infiltration and population increases required an enlargement of plant capacity in 1929.

Hopper bottom primary settling tanks were provided, while retaining the old septic tanks as single stage unheated digesters. One acre of sprinkling filter area was added to treat sewage flow in excess of that applied at a fixed rate to the sand filters. Effluent from both new and old filters is settled in secondary tanks which serve also as chlorine contact tanks, residual chlorine of 0.5 ppm. being maintained in the final effluent.

The improvement in effluent quality was immediate, but other problems soon developed. Primary sludge contained excessive quantities of grit which banked in the hoppers and proved difficult to remove. Septic conditions prevailed, thick scum was produced, and detention time was materially reduced. In 1934 two of the four settling tanks were altered and equipped with continuous sludge removal mechanism. At the same time, the septic tank digesters were provided with cast iron gas domes, heating coils, and a gas burning boiler was installed.

On completion of this work it was necessary to place units in operation during cold weather. Leaks developed in digester construction joints, loss of gas reduced heating capacity, and it became necessary to draw undigested sludge to drying beds. Complaints of odor again became serious.

In 1941 the two remaining primary settling tanks were equipped with sludge removal mechanism and a new two stage digester was built. This includes a primary (heated) unit, with scum breakers and collectors, a secondary (unheated) unit, and a floating gas holder. Present practice consists

"Round Tablers"
Geo. Cameron, Superintendent*
Atlantic City Sewerage Co.
Leroy H. Graul, Chief Operator
Wildwood, N. J.
Wm. E. Collings, Supt. Water & Sewerage
Collingswood, N. J.
*Leader

of sending sludge from the secondary digester to the old digesters, withdrawing clear supernatant from this third stage (for return to the primary tanks), and drying sludge on covered beds.

When starting the new digester,

M. S. Kachorsky, Supt.
Manville, N. J.
Raymond G. Case, Supt.
Merchantsville-Pensauken Plant
Oaklyn, N. J.
S. M. Rusk, Supt.
New Providence, N. J.

accumulated sludge was so acid (pH 5.2) that daily addition of 500 to 700 pounds of lime with new sludge had no effect. Finally four tons of lime was mixed directly in the digesters and raised the pH to 7.2, where it has since remained. A well digested sludge is now produced (yielding an estimated one cu. ft. per capita of gas), dries readily without odor, and is in demand as a fertilizer.

After this long series of troubles, all plant units now function satisfactorily. Suspended solids in the trickling filter effluent average 15 ppm.; in the sand filter effluent, none. The B.O.D. of the combined effluents averages 5 ppm. Oxygen saturation of the brook below the entrance of plant effluent is 75 to 85% and conditions are much improved downstream.

"Recent Results of Biofiltration," by W. Allen Darby, Sanitary Engineer, Dorr Company, New York.

Mr. Darby's paper, presented by R. S. Rankin of the Dorr Co., described the unusual growth in number of these plants: The first built in 1936, approximately 100 installed in 1942, bringing the present total to about 200. Primarily responsible is the war effort and the fact that these plants have accomplished the results for which they were intended. Sewage flows from populations as low as 500 and as high as 80,000 are treated, with larger plants under consideration.

Several papers describing operation of these plants have already been published, and only a brief review of the three main schemes was given. Under ordinary conditions removals may be assumed as follows: single stage intermediate treatment, 50 to 60% (of both B.O.D. and suspended solids); single stage complete treatment, 80 to 90%; two stage complete treatment, 90 to 95%. It was emphasized that complete operating data is important in determining the efficiency of various units in such plants.

Results were cited from one plant designed for 20,000 persons; they covered one month of operation after the plant had functioned for a year. The flow at this plant is actually 50% overload on the basis of population and 38% overload on the basis of design flow. Oper-

D. Fred Barton
Chrm. Sew. Comm.
and
E. Arthur Bell
Boro Engr.
Essex Fells, N. J.

W. W. Edwards
Councilman
and
Frank L. Bruce
Plant Supt.
Pleasantville, N. J.

Traveling
Laboratory
U. S. Engineers
(Formerly Coca-
Cola Co.'s traveling
Lab.)

LeRoy H. Graul
Supt.
N. Wildwood, N. J.
and
E. W. "Bill" Gray
Bldrs.-Providence
Philadelphia, Pa.

"Bill" Eastburn
Mathieson Alkali
Wks., Philadelphia,
and
D. C. Freas, Treas.
Atlantic City Sew.
Co.

ating as a single stage complete treatment unit and handling a strong sewage (340 ppm. B.O.D., 293 ppm. suspended solids), this plant accomplishes an 84% removal of B.O.D. and an 89.5% reduction in suspended solids. On the basis of B.O.D. removal, the percentage of overall reduction is: primary clarifier, 60.2%; Biofilter, 31.7%; and secondary clarifier, 8.1%. In most plants it is usual to find a larger percentage of work accomplished by the secondary clarifiers.

The author advised that the digester supernatant should be included in determining loadings through a plant. Overloaded digesters, or inadequate sludge bed capacity (necessitating long storage of sludge in digester units) will result in the return of supernatant high in B.O.D. This invariably results in trouble for plant operators and, for this reason, the B.O.D. of digester supernatant should be run as a routine determination. Data regarding pounds of B.O.D. removed per kilowatt hour of power is being assembled and will be presented in a future paper.

"Lime Activities on Sewage Treatment," by Dr. H. W. Gehm, Associate, New Jersey Experimental Station, New Brunswick.

Dr. Gehm mentioned that, while lime is widely used for pH adjustment, sludge dewatering, and chemical precipitation, we have known relatively little of its properties. Different limes and different shipments of the same lime have been found to give differing results.

Research during the past three years has made use of two new methods of examination: the x-ray diffraction pattern and the electron microscope. These have provided evidence that control of lime processing and the temperature regulation enable production of lime most suitable for specific purposes. The physical properties of limes may differ widely despite almost identical chemical characteristics.

Solubility of lime is considered extremely important since dissolved lime is much more effective in coagulation than is suspended lime. Plant results with highly soluble lime were even better than laboratory results. The correction of pH and chemical precipitation are accomplished more readily with such limes. It is indicated that maintenance of low humidity may be important at plants where much lime is fed. This whole field of research appears very promising and new studies are under way.

Operator's Round Table

(Leader, George Cameron, Superintendent, Atlantic City Sewerage Co.)

(1) (2) (3) (4) (5)

(1)—*A. L. Soden, Chief Operator*
Trenton, N. J.

(2)—*Walter A. Spencer, Supt.*
Merchantville-Pensauken Water Com.

(3)—*Wm. Raisch, Consulting Engr.*
Borough of Queens, New York

(4)— *Joseph H. Le Chard, Chief Engr.*
Atlantic City Sewage Co.

(5)—*R. C. Beckett, Chief Engr.*
State Dept. Health, Dover, Del.

Question: What is the most practical way of protecting sewage pumps against rags?

R. Case: At Merchantville this condition was much improved by changing from 2 inch to 1 inch bar screens. The installation of a grit chamber gave further protection.

F. A. Mowery: No trouble is experienced when an air lift is employed. But power cost of this method is high, 10 hp. as compared with 1.5 hp. for a Chicago "Screw-Peller" pump which has been substituted. This type of pump seldom clogs.

B. I. Corson: Another good reason for not using an air lift is that this method may create a gas hazard. Rags cause no difficulties in plunger pumps.

Sol Seid, Supt.
Treatment Plant, New Brunswick, N. J.

C. B. McMenamin, Supt.
Middlesex, N. J.

John Struss, Supt.
North Wildwood, N. J.

Question: How is cast iron best protected against corrosion?

R. Case: Usually no protection is required, though coatings may be useful. It has been learned that copper floats and chains given two coats of Inertop have several times the life of those not protected and that they may be recoated whenever needed.

W. E. Collings: Aluminum floats have been found less subject to corrosion than copper floats. Under humid conditions of glass covered sludge beds, aluminum paints have been found most lasting. Metal surfaces to be painted with aluminum should be well cleaned and a good grade of asphaltum base should be used.

Question: Will specific gravity tests prove a substitution for suspended solids determinations?

B. I. Corson: They may be of

"Al" Paxton
Manager
and
"Ed" Cleary
Mng. Editor
Engr. News Record
N. Y. City

"Bart" Marshall
(Chain Belt Co.)
"Shorty" Germond
(W. & T. Co.)
I. M. Glace
Const. Engr.
Harrisburg, Pa.

Jimmie Angell
"Water Works & Sewerage"
New York
Johnnie Horgan
Ralph B. Carter Co.
New York

value for sludge tests, but not on raw sewages.

Question: What is the best method of treating laundry wastes?

G. Jackson: In an Imhoff plant much scum has accumulated in gas vents from such waste. Prior treatment of the waste by coagulation with alum has proven effective in some instances.

Sewage Sludge for Victory Gardens?

Dr. William Rudolfs, Chief, Water and Sewage Research, N. J. Expt. Station, New Brunswick, called attention to a recent bulletin published by the station which reports important analytical data on the types of sewage sludges available in the state. As a matter of safety, it is recommended that only well digested sludge should be used for vegetable gardens and then only for vegetables which will not be eaten raw. Examination of digested sludges showed no danger existed from amebic dysentery cysts; nevertheless, the psychological effect is bad and sludge may be blamed for epidemics. When sludge is used, it should be composed and left from fall until the next spring, and not mixed prior to planting.

Freezing and thawing may kill over 99% of the bacteria present in sludge but still does not assure the safety of raw sludge. Ordinary sludge has a tendency to make soil acid, due to its grease content, and chemical sludges may be excessively acid or alkaline from added coagulants. Even when well digested sludge is used, excessive amounts should not be applied. It is recommended that not more than 15 tons of sludge (air dried, 50 to 70% moisture) should be applied per acre. Too heavy applications produce rank growth of less sturdy plants.

Exhibitors

The following firms were represented at the Victory Conference of America's oldest sewage works association, and contributed to the financial support of its 28th annual meeting by subscribing for both space in the exhibit hall, notwithstanding the fact that many of these firms had nothing more to exhibit than a bouquet of pretty flowers or some interesting pictures, and the firm's name —effectively saying

"Present"

American City
Carter Co., Ralph B.
Chain Belt Co.
Chicago Pump Co.
Dorr Company
Engineering News-Record
Flexible Sewer Rod Equipment Co.
Johns-Manville
Limestone Products Corp.
Link-Belt Co.
Pacific Flush-Tank Co.
Pennsylvania Salt Mfg. Co.
Pittsburgh-Equitable Meter Co.
Public Works
Royer Foundry & Machine Co.
Sewage Works Engineering
Vapor Recovery Systems Co.
Wailes Dove-Hermiston Corp.
Wallace & Tiernan Co.
Water Works & Sewerage

L. L. Langford
"P.F.T."
New York

S. V. Flynn
"J-M"
Philadelphia

Calvin F. Ellis
Supt.
Moorestown

Jack Foulks
Neptune
New York

R. B. Whittimore
Operator
Ridgewood

"Bob" Coltart
Link-Belt
Philadelphia

"Shorty" Germond
W. & T.
New York

The Rahway Valley Section
(Twelve of the Eighteen Members Attending)
(Reading from left to right)

Anderson (Woodbridge)
Rusk (New Providence)
Kachorsky (Manville)
Fontenelli (Rahway)
Ayers (Highland Park)
De Voe (South River)
Seid (New Brunswick)
Downes (Plainfield)
Gadomski (Perth Amboy)
Rush (Sayerville)
Van der Vliet (Mayw'd)
Gehm (New Brunswick)

Officers: De Voe, President; Gadomski, Vice-President; Seid, Secretary

THE W.P.B. AND SEWERAGE*

Some New Developments Pertaining to the Activities of the War Production Board in Sewage Collection and Disposal and Sanitation

By MAURY MAVERICK
Director
GOVERNMENTAL DIVISION
WAR PRODUCTION BOARD
WASHINGTON, D. C.

IT IS a privilege to address trained professional men who are doing an absolutely essential job necessary for civilized society. The very beginnings of society—and the progress of society—are rooted in man's knowledge of the use of water and the sun, and the development of proper systems of sewage disposal.

As Director of the Governmental Division of the War Production Board and in recognition of the intimate relationship which exists between sanitation and public health, I recently invited qualified representatives in your field to meet with me to discuss all phases of the sanitation problem. They were: Linn H. Enslow, immediate Past-Chairman of the Sanitary Engineering Division of the American Society of Civil Engineers; William Raisch, Chairman of the Process Industries Division and Sanitation Group of The American Society of Mechanical Engineers; and George J. Schroepfer, President of the Federation of Sewage Works Associations. This professional advice was sought and accepted by me on behalf of the War Production Board.

I mention this at the outset so that you will know that I appreciate the best professional advice, and intend to carry on the affairs of my Division in an unbiased, non-political and business-like way.

From all indications we have long, cruel, hard and bloody years of warfare ahead of us. In order to win this war—and of course that is our most important job—there must be world-wide offensives. These offensives will require millions and more millions of tons of critical materials. Naturally, this will mean the curtailment of many of the activities of the states and municipalities and postponement of many construction projects ordinarily considered essential.

Only those activities which are basically necessary to maintain the health and welfare of the people can be justified; and, *everything that can possibly be deferred must be deferred.* But it is likewise true that absolutely essential services must be kept up—in total war you cannot separate many of the functions of a society at war. If you don't have proper sanitation, you can't keep people alive; you can't get soldiers to the front—in other words some things are just as essential as fighting itself.

The Honorable Maury Maverick

From the competent advisors I have mentioned and from knowledge lately acquired, I have obtained certain facts which you as professional men probably know, but which I here put in the record, so that the American people, and all government officials, Federal, State and local will know them as well.

The facts are these. In the United States there are something like 7,000 treatment plants—I believe a surprising figure to most people. Of these, 6,711 sewage treatment plants serve a population of 200 and upwards. Of this number, more than 500 are serving Army posts, or other defense areas. Of the approximately 6,191 plants serving a civilian population of sixty-one million people, 4,718 of such plants may be termed as relatively modern plants completed during the past decade—a most phenomenal increase.

While I discuss briefly the functions of the Governmental Division keep the foregoing facts in mind.

Early in the war, it became apparent that the needs of the governmental agencies ought to be considered as being distinct from the needs for industry. Governmental agencies are not entitled to special privileges but everyone recognizes that governmental functions must be preserved in time of war. Therefore, the Governmental Division was set up to handle all applications for priority assistance from Federal, state, local and municipal agencies of government as well as all other public bodies and public and private institutions.

It is only natural for municipal officials to be proud of their cities and want to provide the best for them. And it may well be that their requirements are important from a *local* point of view. However, the question is how do they compare with the needs in hundreds of other localities? . . . The point is, we have added up all critical materials on hand to determine just what quantity is available and this figure shows that after setting aside critical materials we need to throw at the Japs, Germans and Italians . . . the remainder is not large enough to meet all other needs. This condition will last some time, it is believed, yet the governmental division is receiving from fifty to a hundred applications a day for approval of all kinds of projects. Concerning sewer projects, they ranged a day or two ago from a little one of $1,300 to another for $1,400,000.

$43,000,000 Spent for Sewerage Facilities Last Year and More Predicted for 1943

Last year, even with the necessary curtailment of work, some 43 million dollars were expended for this purpose in the United States. Under normal peace-time conditions, this amount would, of course, have been far greater. The difference between what *was* spent and what *would* have been spent represents projects which are now accumulated on the shelf, awaiting the end of hostilities.

I do not hazard a guess on how much construction of municipal sewage treatment plants can be approved in 1943. However, with $43,000,000 spent last year, competent authorities claim that it will be necessary to spend $73,000,000 in 1943. I mere-

*Excerpts from a special address by the Director of the Governmental Division of the WPB before the 28th Annual Meeting of the New Jersey Sewage Works Association in Trenton, N. J., March 25, 1943.

ly present these figures so the cards are all out on the national table. It may be that many projects will have to be considered after the war, that is, many will have to be deferred; let's call the latter "post-war planning."

But concerning the large amount of systems which it now appears necessary to construct, it is established that for the duration of the war we can approve only limited projects which are directly connected with the war effort, as for example, those sponsored by the Federal Works Agency where either extensions of existing systems or the building of new systems are made necessary because of the heavy influx of war workers into munition and armament centers. Also, it seems we must find a way for getting materials for work that cannot be deferred without endangering the health and welfare of the people.

This means, however, that new disposal plants cannot be advanced at the present unless, for instance, it can be shown that the sewage contaminates the river which is used as a source of water supply further downstream. Even then, it is a question whether the disposal plant should be built or whether additional facilities should be installed in the water purification plant. The plan involving the least amount of critical materials is most likely to be approved.

How Far Can We Go: How Far Must We Go?

In many cases, substitutions have had to be made in the construction of sewage systems and disposal plants. The Governmental Division has been allotted a comparatively small quantity of iron and steel available for use where absolutely essential. Approval, therefore, must be restricted to cases of the most urgent needs.

At the same time, every expedient must be resorted to even in essential projects so as to allow our allotments of materials to be spread as widely as possible and thereby to serve the greatest number of people.

So-called complete treatment is practically out for the duration and instead, partial or primary treatment will have to suffice.

In carrying on our work, we have had the assistance of the U. S. Public Health Service and all projects are referred to that agency for review prior to final action on our part. Our representatives visit the areas from which projects are submitted and then turn over to us a report of their findings.

Maintenance of First Importance

There are other problems in addition to those having to do with new construction. Sewage treatment plants must be maintained. We fully realize that. As you know, Preference Rating Order P-46, covering repair and operating supplies for utilities has been superseded by two orders, U-1 and P-141. The former, issued by the Office of Utilities, does not cover public sanitation services. P-141, issued by the Director General for Operations, February 27, 1943, covers only sewage and public sanitation services and is administered by the Governmental Division. Insofar as public sanitation service is concerned, this order is substantially the same as P-46. On February 9, 1943, the War Production Board issued CMP* Regulation No. 5, which also affects sanitation services.

The New CMP Regulations

This regulation provides a method for obtaining controlled materials and other products and materials needed for essential maintenance, repair and operating supplies for specified businesses and services. Ratings to be given are determined by listings in Schedules I and II which accompany the Regulation. Sanitation services are included in Schedule I which carries a rating of AA-1.

The War Production Board has recently issued CMP Regulation 5A which, with a few exceptions not applicable to sanitation services, takes the place of CMP Regulation No. 5 insofar as the governmental agencies and institutions are concerned. This regulation makes provision for maintenance, repair and operating supplies for sanitary sewers and sewage disposal, refuse collection and disposal and storm sewers.

In order to conform with the Controlled Materials Plan, and particularly with CMP Regulation No. 5A, it has become necessary to revise Order P-141, even before it was distributed to any extent. This revision is now in process and careful consideration to sewage problems is being given.

Let Us Know Your Problems

Whenever you have problems, let us know. In writing about these matters, address your letter to the Governmental Division, Reference P-141. While we have tried to keep municipal officials advised through news releases, we know that we have not fully succeeded in doing so. Therefore, to augment these, upon advice of your associates, arrangements have now been made to mail copies of Order P-141 and any changes that may be made to all cities of ten thousand population or larger and it is hoped that this service eventually can be extended to all. In addition, a simplified interpretation of existing orders in popular language, is now being prepared and will also be forwarded to those on the mailing list.

A New Section to Handle Sewerage and Sanitation

In the beginning of my talk I told you we want the best advice possible. We have asked the three gentlemen I earlier mentioned to act as consultants. The recommendations of the Raisch-Schroepfer-Enslow Committee will be accepted and put into effect. Among other things, following their recommendations we will set up a new Section in the Governmental Division to deal exclusively with Sewerage and Sanitation problems. This new Section will be administered by a man of proven ability in this field. I am sure that this will go far in clarifying the priorities situation.

Do not hesitate to forward your requirements to us, whether they are for new construction or for maintenance and operating supplies. In so doing, you will gain authoritative advice on your problems, and, in addition, your requirements will be listed in our files pending action during the transition period following the end of military hostilities. This may help you in expediting your work when that time comes and we all hope it may be very soon.

Post-War Planning

At this point I want to say a word about "post-war planning." This planning should be initiated to the greatest extent in cities, towns, counties, and from states—that is, directly from and by the people themselves, who know their own needs. Everybody knows that we need billions of dollars for housing, roads, streets, bridges, sewers, water systems, hospitals, schools, colleges, clinics, recreation projects drainage districts, and numerous other types of projects. Therefore, where planning can be done for what appears a future necessity, if it can be done without harming the war effort, it should be done. To delineate the fields of action, cities, counties, towns, states—and the Federal Government itself—should each in its field or re-

*Controlled Materials Plan.

gion prepare plans for the future where the need appears.

I want you to know that we in the Governmental Division are interested in your problem and will appreciate your cooperation. Of course, we cannot always approve projects which you feel are important. We must many times ask that you postpone building of one sort or another. Nevertheless, *it is our responsibility to maintain those fundamental functions which must be maintained* and our responsibility to see that local government receives its proper attention throughout this war.

If we realize that the days ahead will undoubtedly be dark and bloody, and if we are determined that our children shall live to see a better world, success and Victory shall be ours. Let us speak of Victory, let us move with confidence, knowing that this confidence is not false optimism but rather a calm realization that no matter what comes, we will meet it and master it.

A. M. RAWN* HEADS NEW W.P.B. SEWAGE SECTION

Vice-President of Sewage Works Federation Already on the Job

A. M. Rawn

Printed in this same issue are excerpts from an address by the Honorable Maury Maverick, Director of the Governmental Division of the War Production Board, in which it is announced that a special Sewage and Sanitation Section was to be established in the Governmental Division to handle all matters pertaining to sewage. Further, that this new Section would be administered by "a man of proven ability in this field."

For duty as Chief of the new Sewage and Sanitation Section, A. M. Rawn arrived in Washington on April 12th, and got to work in "Rawnonian" fashion to do a much needed job in behalf of his Government and in consideration of the needs of sewage works operators and managers in particular. In addition to the highly important maintenance and operation phase of sewage disposal, the new Chief is charged also with the analysis and recommendation for approval or rejection of all sewerage and sewage treatment projects from here out.

There are probably few of our readers who need any introduction to Rawn, but for those who may here is some of his background. He is Chief Engineer and General Manager of the Los Angeles County Sanitation Districts in California. He is now Vice-President of the Sewage Works Federation and slated for President in October. These two positions in themselves are sufficient to cover not alone the specification of "proven ability" but also his proven leadership and standing in the sewage field. But, in addition, he is a "wheel-horse" member of the Board of Directors of A.S.C.E. and a past-president of the California Section of the Society, and of the California Sewage Works Association, in which he is serving another term as Director. He is Chairman of the important Sewage Works Federation Committee on War Problems and Post-War Planning. In recognition of his helpful guidance and leadership, Rawn was made a life-member of the Arizona Sewage and Water Works Association and maintains membership and an interest in the American Water Works Association's West Coast activities.

"A.M." in World War I served overseas in the A.E.F. as 1st Lieutenant, U. S. Engineers, and maintains a membership in the American Society of Military Engineers. This appointment is not his first service to the nation in World War II, because he was loaned to Washington as Consulting Engineer on Sewerage to the Construction Quartermaster during construction of the many new cantonments.

It is perhaps proper to say that Mr. Rawn has taken on his present duties at a personal sacrifice in more ways than one. And, it is a privilege to say that in Director Maverick's plans to Rawn's Board of Commissioners in California, to make his coming possible, and without undue financial sacrifice, that arrangements were made whereby the compensation deficiency is being met by the Los Angeles County Board and Rawn will check into Los Angeles by plane at monthly intervals for general oversight.

*Associate Editor, Water Works and Sewerage.

Maryland-Delaware Association Has a "Must" Program

The Maryland-Delaware Water and Sewage Works Ass'n, holding its annual meeting on May 13th and 14th in Baltimore, Md. (Lord Baltimore Hotel), has arranged an interesting and meaty program which should attract a goodly attendance of both water and sewage men.

The first full session is being devoted to a symposium with a number of speakers presenting brief talks on "Substitutions in Wartime Construction and Operation." And this is appropriately followed by an interpretation of the latest "Priorities Regulation" by Lloyd Nelson of the W.P.B.

In another session Baltimore's "Experiences With Cathodic Protection" is featured in a paper by G. L. O'Brien. Another important topic is the explanation of "A Rapid Method of Analyzing Flows in Water Distribution Systems" and another is on the "Preparation of a Valved Water Distribution System for Emergency Service." The meeting closes with a review of "Manpower Problems in the Sanitary Field" by Capt. C. W. Klassen of the War Manpower Commission.

On the evening of the first day the Annual Dinner will be held as usual, with entertainment and dancing following. A well-rounded-out meeting and a technical program which should be considered a MUST by plant operators and managers.

[Ed. Note: It is in the making to have A. M. Rawn, recently appointed Chief of W.P.B.'s new Sewage and Sanitation Section, discuss the activities of this Section and the new Sewerage Preference Order P-141.]

FUNDAMENTALS OF AUTOMATIC OPERATION OF CENTRIFUGAL PUMPS

By W. D. HAENTJENS
Engineer
BARRETT, HAENTJENS & CO.
HAZELTON, PA.

THE purpose of automatic pumping is, in most cases, the achievement of more economical operation through the elimination of an attendant. At times, the purpose is greater safety of operation.

In the simplest case of automatic pump control, that is, pumps operating with a positive head on the suction, no special equipment except float switches and automatic starters is required.

Pumps operating with a suction lift can be equipped with a footvalve which keeps the pump filled with water between runs. Automatic control here can be the same as that for pumps operating with a head on the suction. However, the use of a footvalve results in somewhat unreliable control. There are several objections to the use of a footvalve; (1) the pump is unprotected from water-hammer and failure of the pump casing may result; (2) the footvalve may leak, thus leaving the pump without water. When the pump is started, damage would undoubtedly result to the pump; (3) friction in the footvalve results in an increased suction lift.

Components of Automatic Control Systems

A brief description of the operation of a few of the components of an automatic control system (Fig. 1) is perhaps in order here.

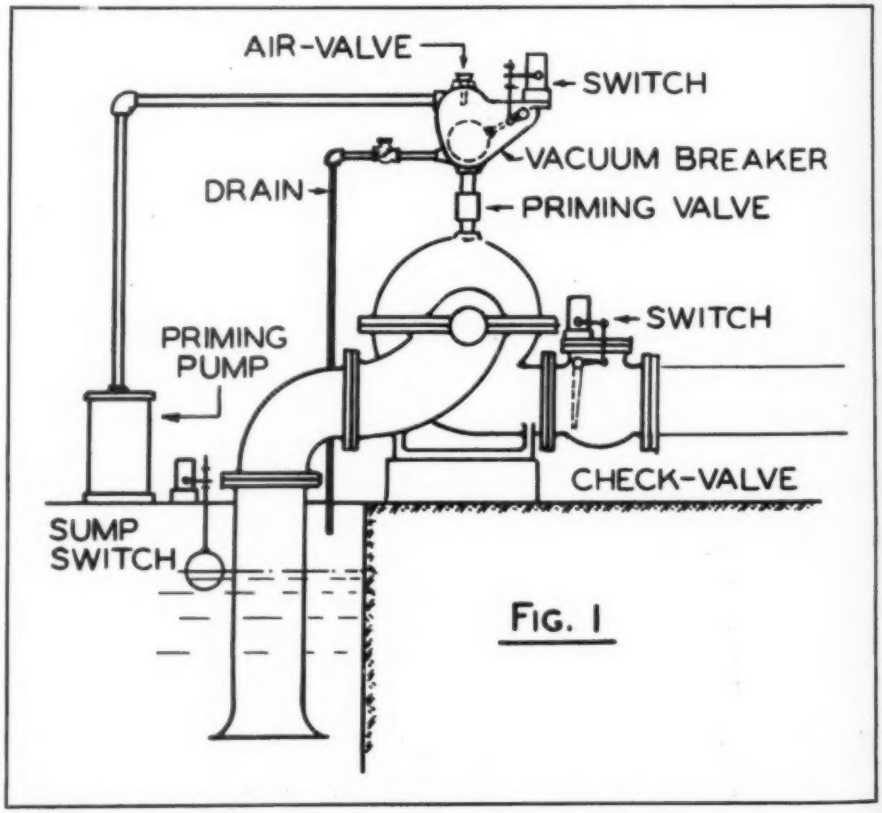
I. Check Valve with Switch—The check value is always placed on the discharge end of the pump. To the flap of this valve is attached a switch. This switch may be one such as a lever-operated contact switch or a Mercoid switch. The switch, normally open, closes when the pump goes into operation and remains closed as long as the pump is discharging water.

II. Priming Valve—This is an automatic valve which is mounted on the top of the centrifugal pump casing. It permits the passage of air through it during the priming operation, but closes when water at the operating pump pressure attempts to flow through it. It remains closed only so long as the pump is in operation.

III. Vacuum Breaker with Priming Switch—This unit is mounted so as to be higher than the priming valve. Air exhausted by the priming pump passes through the pump casing, then through the priming valve and vacuum breaker to the priming pump. The action of the vacuum breaker is: (1) to prevent water from entering the priming pump, (2) to actuate the priming switch when priming is completed, (3) to automatically drain and prepare for a new priming cycle once the pump is in operation. The priming switch is normally open. When the water enters the vacuum breaker chamber, the float rises and simultaneously closes the switch and opens an air valve. Air, entering through this valve, breaks the vacuum and permits the water to drain out of the chamber.

For safe and dependable control of pumps operating with a suction lift, a vacuum pump is used. Reduced pressure produced by the vacuum pump permits the water to rise from the sump into the pump, filling the pump casing and float chamber. As the float in the chamber rises, it operates the priming switch which is connected with the starting circuit of the centrifugal pump motor. Shutting down of the priming pump is also accomplished at the same instant.

In its simplest form these arrangements are shown diagrammatically in Figure 1. The check valve prevents the entrance of air during the priming period and arrests the back flow of water when the discharge line is filled and the pump stands idle. In the latter condition, the pump in starting must produce a pressure sufficiently great to open the main-line check valve against the full water column pressure. This fact makes priming difficult when there are air pockets in the suction line. The air from these pockets, when drawn into the pump, gathers around the impeller hub, causing the pump to lose suction and preventing it from building up sufficient pres-



Components of an Automatic Control System

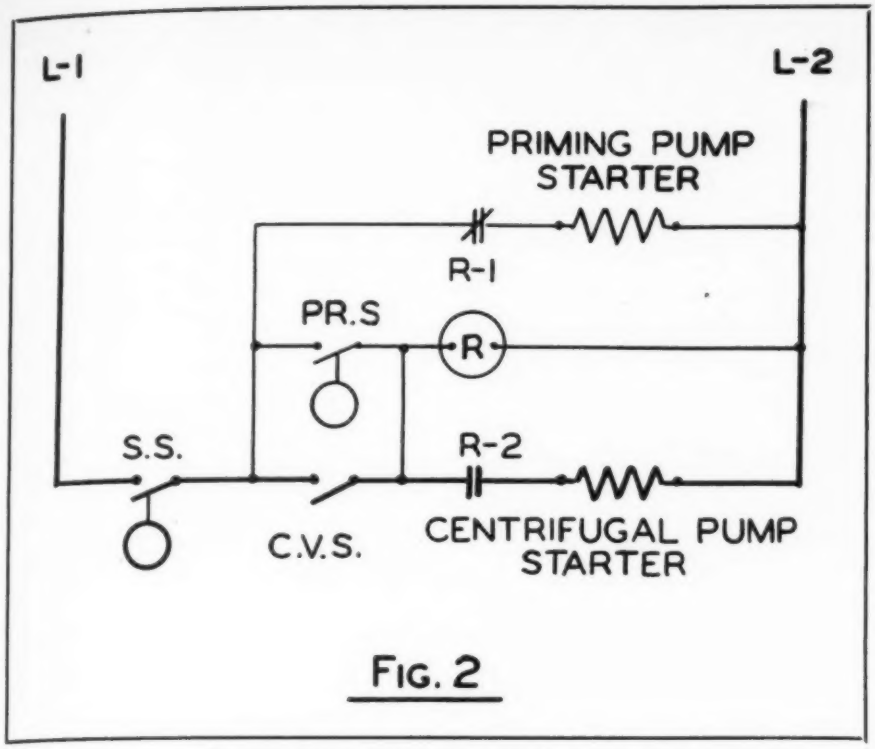


FIG. 2

Electrical Connections for System in Fig. 1

sure to start the flow of water through the check valve.

In order to remove this air, the pump must be stopped and allowed to remain idle sufficiently long for all the entrapped air to rise to the top of the pump casing. It can then be removed by the priming pump at the next priming attempt.

It is therefore evident that automatic control must provide for more than one start and for a delay between starts. Not only air pockets, but also air leaking through the stuffing boxes may destroy the prime. At the first start, water is forced into the water seal ring of the stuffing box. This stops or so greatly reduces the leakage that the pump will be properly primed after two or perhaps three priming attempts.

Should the seal water not stop the leakage, there may result a continuous starting and stopping of the priming pump and the centrifugal pump. Automatic control must therefore limit the number of starts to three or four. The justification for this feature was clearly illustrated by experience in early automatic installations. In one instance, one standard automatic starter for a squirrel cage motor made 450 starts from 1 p. m. Monday afternoon to 7 a. m. Tuesday morning, a total of 25 starts per hour for 18 hours. This starter was roasted.

The air leak may be so large that the priming pump cannot dispose of all the air leaking into the system and therefore cannot draw the water into the float-chamber. In that case, the priming pump will continue to run indefinitely. Thus in order to prevent damage to the priming pump or over-flowing of the sump, automatic control should limit the time required for priming.

Referring again to Figure 1, the priming valve is held open by the action of a spring and closed by water pressure when the pump begins to discharge water. As soon as this valve closes, the float-chamber begins to drain and its switch will open. It is important that the float-chamber drains slowly so that sufficient time is permitted for the pump to build up speed and close the check valve switch before the priming switch opens. If this did not happen, the pump would immediately stop.

Electrical Circuits

Figure 2 shows the electrical connections for the above arrangement. When the water rises in the sump, closing the sump switch, current flows from Line 1, through the sump switch, SS, and the normally closed contact, R-1 of the relay R, thus energizing the priming pump starter. The priming pump begins operation. When priming is completed and the water rises into the priming cham-

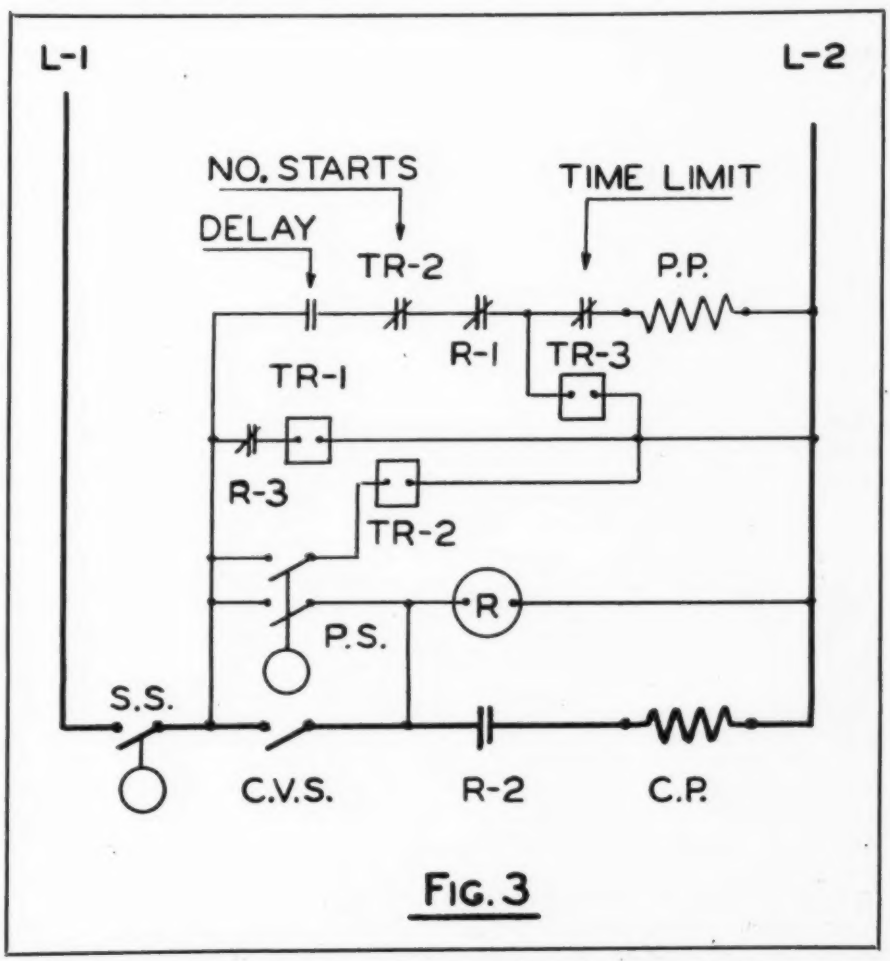


FIG. 3

The Time Relay Circuit for Preventing False Pump Starts

ber, the priming switch closes, energizing the relay R. This opens contact R-1, stopping the priming pump, and closes R-2, energizing the centrifugal pump starter. As the pump builds up speed and begins to discharge water, the check valve switch will shunt out the priming switch. The priming switch opens as the priming chamber drains. The importance of slow draining of the chamber can be readily understood here. The pump is now operating under protection on the check valve switch. Should the pump lose the water, the check valve switch will open, and the pump will stop. Relay R is no longer energized and R-2 drops out and R-1 closes again. If the sump switch is still closed, the priming cycle will be repeated.

Prevention of False Starts

To prevent too many false starts, a time relay is placed in the circuit, controlled by the vacuum breaker switch. The simplified wiring diagram, with other features, is shown in Figure 3. The timing action of this relay, TR-2, occurs only while the priming switch is closed, When a sufficient time for several priming attempts has elapsed, TR-2 opens.

The complete automatic action is exemplified by Figure 3. This action is as follows: When the water in the sump rises and closes the sump switch, SS, current flows from Line 1 through normally closed contact R-3 and time delay relay, TR-1, to Line 2. Then, TR-1 begins to time. After it has timed out, contact TR-1 closes and now permits current to flow through the normally closed contact TR-2 of time relay TR-2, then through the normally closed contact R-1 and through the normally closed contact TR-3 of time relay HR-3, to the priming pump starter which is now energized and starts the priming pump. When priming is completed and the priming chamber is filled, the priming switch PS closes and time relay TR-2 begins to time. At the same instant, relay R is energized, closing R-2 and opening R-3 and R-1, thus the centrifugal pump starter is energized and the pump starts; the priming pump stops and time relay TR-1 is reset.

Time relay TR-2 is cumulative, i.e., TR-2 opens only when the total time required for several normal starts is exceeded. Time limit relay, TR-3, is set for about 15 to 30 minutes to limit the time of operation of the priming pump during any one prime. Time delay relay, TR-1, has been reset by the opening of R-3 so that it will be able to delay a second priming attempt if the first was unsuccessful. Since large pumps are idle for as long as 30 seconds, TR-1 is set to trip in about one minute. If the pump is still not in operation after several priming attempts, time relay TR-2 locks out so that the system now completely ceases operation, but an alarm signal sounds either in the foreman's office or at any desired location. The system will not operate again until the trouble has been remedied and time relay, TR-2, reset by hand. Note, however, that all relays must automatically reset when the sump switch opens.

It is not the intention of this article to give a detailed description of the mechanical and electrical devices. These may vary considerably but they should provide the sequence of operation and protection outlined. Additional features such as pressure and vacuum regulator switches, water level indicators, thermostats on the pump main and thrust bearings, etc., may be added for greater safety. The most recent innovation is the use of electrodes in the sump in place of float switches.

Clarence Bahlman Is Dead

For 35 Years Connected with Cincinnati Filter Plant

Clarence Bahlman, long-time Superintendent of Filtration at Cincinnati, Ohio, passed away, on April 6th, in a hospital after a brief illness. He was 61 years old.

Mr. Bahlman was one of those old faithfuls and "wheel-horse" in

C. Bahlman

the pioneering Ohio Conference on Water Purification long before water purification men were introduced to pH and when b. coli was just plain b. coli. His service with the Cincinnati Water Department dates back 35 years—the past 14 years of which he had been Superintendent of the Filtration Plant.

In the Ohio Conference his annual reviews of developments of interest in water treatment were masterpieces in respect to completeness as reviews of the year's literature and the spot-lighting of the more important developments of the year.

Mr. Bahlman is survived by his widow and two daughters.

[Ed. Note: We have been informed that Mr. Bahlman's successor is E. B. Evans, who for a number of years has been Assistant Superintendent at the Cincinnati plant.]

New England Section Officers

At the Annual Meeting of the New England Section of the American Water Works Association, held on March 18, 1943, the following officers were elected for 1943-1944: Chairman, Charles P. Moat, Burlington, Vt.; Vice-Chairman, W. Guy Classon, Leominster, Mass.; Secretary, Samuel M. Ellsworth, Boston, Mass.; Trustees, E. Sherman Chase, Boston, Mass., Horace J. Cook, Auburn, Me.

The A.W.W.A. Director from the New England Section is Warren J. Scott, Hartford, Conn.

A Plan for Providing Funds for Post-War Public Works

The "Second Post-War Planning Act of 1942," was introduced in the House of Representatives in the closing days of the 77th Congress by Congressman Alfred F. Beiter of New York. The bill, if passed, will authorize the Secretary of the Treasury to issue a special series of War Savings Bonds at attractive interest rates; for sale solely to States, counties, cities and towns. The intent of the bill is the encouragement of state and local governments "to accumulate financial reserves and resources for financing post-war public works programs."

The plan is to issue War Savings Bonds on a discount basis, to mature in not more than five years, and be redeemable upon demand, to yield 4 per cent per annum compounded semi-annually. If redemption is requested before maturity and before the end of the war, then investment yield would be 3½ per cent only.

This bill, together with its companion proposal, H.R. 7782, which would provide funds for actual plan preparation by Federal, State and local agencies, was introduced in the House of Representatives late in the closing days of the last Congress, and was not voted upon. The sponsors of this legislation anticipate early renewed consideration in the current congressional session.

FINAL SETTLING TANKS OF NOVEL DESIGN*

And a Study of Their Performance

By RICHARD H. GOULD
Director
DIVISION OF ENGINEERING,
DEPARTMENT OF PUBLIC WORKS,
NEW YORK CITY

IN the Spring of 1942 facilities for secondary treatment were placed in operation of the Bowery Bay Sewage Treatment Works in New York City. The new units included some unusual design features believed to be novel. The flows treated being over 80 per cent of the designed capacity of these facilities, it is thought that the results secured so far may prove of interest.

The Bowery Bay Sewage Treatment Works has an installed capacity of 40 m.g.d. The average flow for the period under discussion, namely, May through December, 1942, has been 32.4 m.g.d. The major treatment elements of the Bowery Bay plant consist of screens, grit chambers, and primary sedimentation of the usual type, aeration tanks incorporating the "step aeration" principle, final settling tanks of novel design, separate sludge concentration tanks for excess activated sludge, sludge digestion tanks with provisions for the generation of power from the digestor gases, as well as sludge storage tanks used in conjunction with the disposal at sea of sludge not otherwise used.

Capacities of Units Below Normal

The capacities provided in these various units are in some cases distinctly below those that are normally provided. The primary settling tanks provide a detention of 1 hour only; the aeration tanks would provide but 2.5 hours of detention if operated as conventional aeration tanks with 25 per cent return sludge; the final settling tanks would have an overflow rate of 1,000 gallons per square foot per day and a detention period of 1.7 hours; the sludge digestion tanks provide about 2.5 cubic feet per capita. The sewage treated may be classified as normal domestic sewage having suspended solids of 197 parts per million and a 5 day B.O.D. of 145 parts per million.

The Author and Designer

In this paper I shall confine my discussion prinicipally to the final settling tanks and more briefly to the aeration tanks, as these two elements are closely related and conditions in the one are dependent upon what happens in the other. The results secured so far have been somewhat affected by the difficulties inherent in the breaking in of a new plant. At the same time, we have been short of operating and laboratory personnel and have had to defer many of the things we would like to have done. Since July the treatment processes have been forced to carry an undue load from exceptionally thick decanted liquor from the digestion tanks. Although the latter condition has not yet been fully corrected, when all things are considered plant performance has been satisfactory. (See Table I.)

Aeration Tank Design And Operation

The aeration tanks at Bowery Bay incorporate the principle of "step aeration" similar to that first established at our Tallmans Island Plant, previously described. They are of spiral flow type with plate diffusers. Each of the two tanks is divided into four passes and the settled sewage may be added in four separate increments, while the returned activated sludge from the final tanks is admitted only at the head end of the first pass of each tank. Ever since the first few weeks of operation no sewage has been added to the first

*This paper was presented before the Sanitary Engineering Division of the Am. Soc. of Civil Engineers, January 21st, 1943.

TABLE I

Average Results by Month—1942

Bowery Bay Sewage Treatment Works, N. Y. City

	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
SUSPENDED SOLIDS (P.P.M.)									
Raw	169	210	192	162	229	252	180	183	197
Primary Effluent	94	86	124	221	165	170	150	117	141
Final Effluent	18	9	10	9	7	14	16	15	12
Aeration Effluent	1020	982	1640	2085	1870	1590	1620	1960	1600
Return Sludge	3080	2220	4080	5440	4700	4040	3660	4620	3980
B. O. D. (P.P.M.)									
Raw	147	132	110	108	145	185	165	165	145
Primary Effluent	95	73	83	131	106	123	132	116	107
Final Effluent	17	13	21	17	10	8	15	16	15
Per cent Volatile Return Sludge	70.6	71.4	67.8	61.1	70.2	70.6	70.2	74.0	69.5
Sludge Index (1)	.40	.66	.89	1.4	.75	.59	.43	.37	.69
Sewage Flow (M.G.D.)	32.3	28.5	33.2	34.9	32.8	34.1	31.1	33.2	32.5
Per cent Return Sludge	31	42	40	44	43	44	58	55	45
Aeration Detention Hours (2)	2.8	2.8	2.7	2.6	2.5	2.5	2.4	2.0	2.5
Final Tank Detention Hours	1.9	1.9	1.9	2.1	1.8	1.5	1.7	1.5	1.8
Final Tank Overflow (Gal./Sq. Ft./Day)	860	774	915	870	820	960	840	825	858
Air (Cu. Ft./Gal)	.50	.58	.50	.49	.54	.64	.72	.73	.59

(1) Donaldson method. (2) Based on conventional aeration tank design and operation.

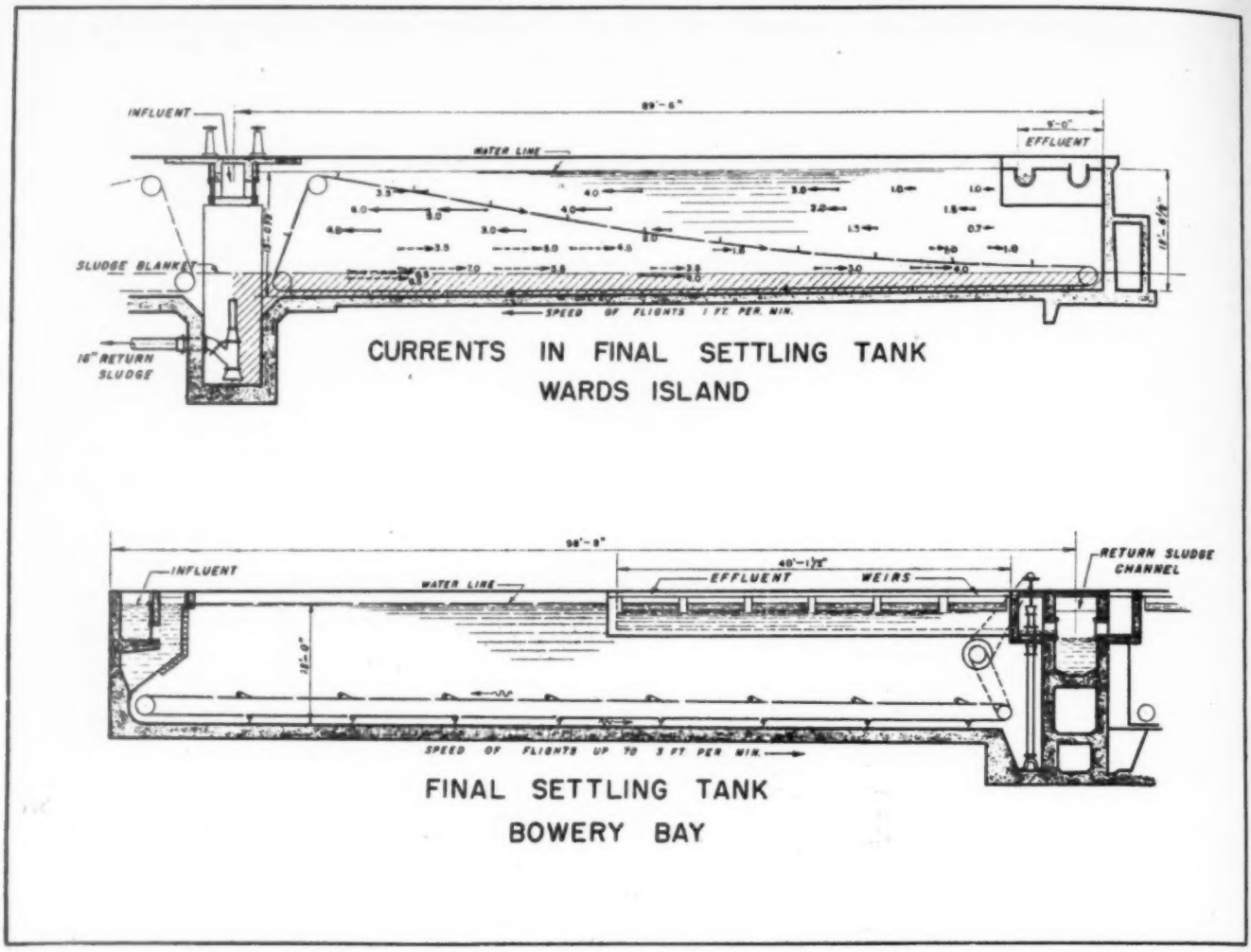


Fig. 1—Design of the New Final Settling Tanks of the Bowery Bay Plant (below). Compared to that of the Wards Island Plant

Compared to that of the Wards Island Plant (note the results of a directional-and-velocity current study of the Wards Island tanks which led to the design departure of the Bowery Bay tanks with bottom inlet, sludge take-off at far end, 300 per cent speed increase of conveyor flights traveling with the flow rather than against it, effluent weirs along sides of tank and extending almost half way back toward inlet end.)

pass. This practice has in effect made of the first pass a unit providing reaeration of the return sludge. The settled sewage has been added in three equal increments at the end of the first, second, and third passes of each tank. The volume of return sludge is usually kept up to about 40 per cent of the sewage flow in order to keep the solids concentration in the first pass of the aeration tanks low enough so that dissolved oxygen can be maintained at all times. Generally the suspended solids in the first pass range from 3,000 to 5,000 parts per million and in the final pass from 1,000 to 1,800 parts per million. This scheme results in a detention period of the sludge in the aeration system of from 3 to 7 days. The dissolved oxygen in the tanks is held at about 1 ppm. in the first pass and about 3 ppm. at the end of the fourth pass.

The Final Settling Tanks

The final settling tanks installed at Bowery Bay are the result of a reappraisal of the functions of the final settling tank and of the characteristics of the specific liquids and solids to be handled. They are believed to be different from any other final tank hitherto used in conjunction with the activated sludge process.

The usual final settling tank seems to have been the result of various adaptations of principles that were developed for primary tanks. The desire to secure maximum concentration of the solids seems to persist, even though such concentration inevitably means a long detention of solids in the tank and consequent deterioration of the sludge. Obviously from a standpoint of the activities taking place in an aeration tank it is desirable to maintain activated sludge under aerobic conditions to the maximum possible extent and to minimize its detention in the final settling tanks. Eventual concentration of the excess sludge is essential, but this should be done elsewhere than in the final settling tank. The function of this latter tank should be limited to the separation of the active sludge from the aeration tank liquor in the shortest possible time and in its speedy return to the aeration tank.

Most of us have appreciated for a long time that activated sludge behaves differently from primary sludge. It was known that it had a tendency to flow over the tank bottom and form a fairly level sludge blanket. Few mechanisms have been provided of sufficient capacity to scrape out all the sludge from the tank quickly. It was known that dependence had to be placed largely on hydraulic flowage to remove the

sludge, particularly when it was of poor settling quality. Circulating currents in final tanks have been noted frequently but their full implication was not apparently realized. Actually it appears that the flocculent nature of this type of sludge is such that in the process of settling, it carries with it large volumes of water. This heavier mixture creates a current along the bottom of the tank away from the influent end. On reaching the far end of the tank the current is forced upward by the end wall and reverses its direction across the top of the tank. In the course of this long flow through the tank, solids separate from the liquid. The clearest water is, therefore, usually found at the *influent end* of the tank and we find that designers for some time have been chasing this clear water with their effluent weirs.

Time honored methods of removing sludge call for an outlet located at the influent end of the tank. Sludge removal is normally assisted by scraper mechanisms that move the sludge toward this outlet. The fallacy here is that the scraper mechanism is working against the natural flow of the sludge along the bottom of the tank. Usually a substantial sludge blanket is built up which can be displaced principally by sludge deposited at the far end of the tank. The usual scraper mechanism thus must carry only very old sludge. The sludge blanket above the scraper flights may flow toward the sludge outlet, induced by the sludge withdrawal, but this may be a time consuming procedure, particularly for the sludge at the distant end. In many plants under these conditions the average detention of sludge in the final tanks must run into a period of many hours.

An attempt was made in the Bowery Bay design to correct these conditions by changing the point of sludge withdrawal to the end of the tank *opposite the incoming flow*. The direction of motion of sludge removal mechanism has been reversed, to correspond to the new point of sludge outlet and to work in the same direction of the natural flow of sludge along the bottom of the tank. (See Fig. 1.)

Operating Results and Flow Observations

The results of operation up to now have vindicated this rather radical departure from the usual practice. Good removal of suspended solids has been secured under high overflow rates. The sludge going through the tanks is in a remarkable fresh condition. Dissolved oxygen in the outgoing sludge has been recorded on numerous occasions and this sludge usually enters the aeration tank with a positive dissolved oxygen value of one part per million or more.

Several efforts have been made to measure the velocity of currents in

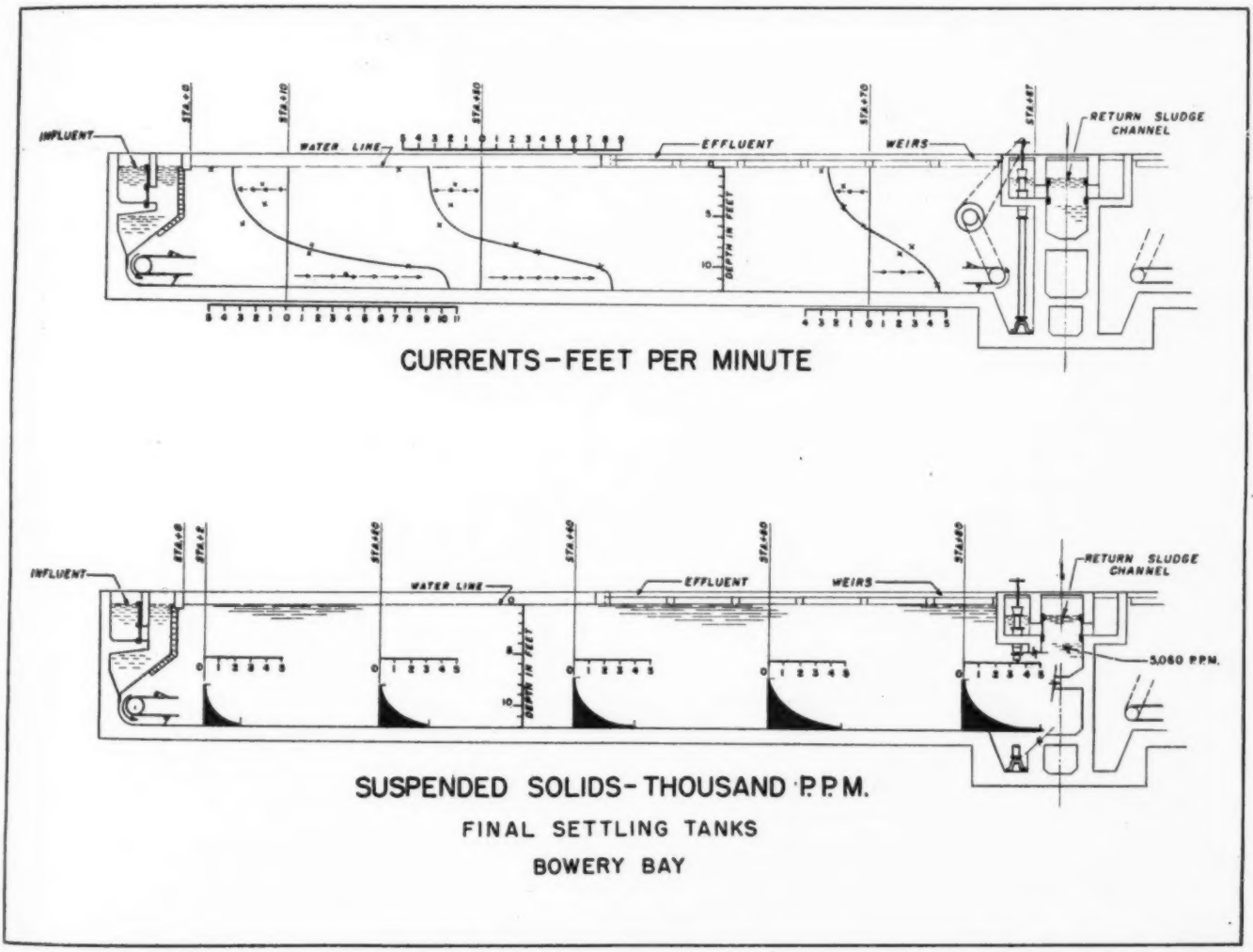


Fig. 2—The Results of Studies of Directional and Velocity Flow and Suspended Solids Distribution in the New Bowery Bay Tanks.

(Such observations have led to the decision to switch the effluent weirs wholly to the inlet end of the tank in future design.)

the final tanks. Typical results (Fig. 2) show that there is a positive current along the bottom of the tank in the magnitude of from 5 to 10 feet per minute. The speed of the scraper mechanism in the original design had been increased to 3 feet per minute. It is found, however, that the velocities of the sludge movement is such as to overrun the scraper flights. The function of the flights is therefore limited to the cleaning out of heavy deposits that might lodge on the floor. These flights actually are more of a hindrance than a help in the major removal problem. The number of these flights may well be reduced, but it would not be safe to eliminate them entirely.

The current tests further indicate that there is a return flow along the top of the tank toward the influent end, as is the case in our older type of final tanks. The effluent weirs of the Bowery Bay are along the side of the tank for about 40 per cent of the distance from the effluent end. While the results have been satisfactory our next design will undoubtedly place *the effluent channel, with the effluent weirs close to the influent end of the tank.* The flights of the scraper mechanism are featured on the return course to influent end of the tank. It seems apparent that this detail will be unnecessary, provided the return flight is raised so as to travel in the upper half of the tank.

Surveys of the suspended solids distribution in the settling tanks (Fig. 2) disclose that the liquid in the upper three-quarters of the tank is clear, continuing about 10 ppm. of suspended solids. Most of the solids were contained in the bottom foot or two of the tank, where the flow was traveling along at a velocity that would carry them to the far end of the tank within 15 minutes of their entrance. The latter circumstance is the essential advantage of this type of final settling tank.

It is thought that this new type of final settling tank will be of material help in solving some of the more difficult of our activated sludge problems. Its use in combination with the "step aeration" principle apparently permits a substantial saving in gross tank capacities. This will be emphasized when it is realized that the tankage provided to receive the sewage flow at Bowery Bay per million gallons of daily flow is only about 35 per cent of that at the Wards Island plant which was designed some thirteen years ago. The results of treatment at these two plants are comparable.

Milwaukee Water Rate Case

Ends With Important Decision

After some five years of investigation the Public Service Commission of Wisconsin, on October 2, 1939, established a new schedule of water rates for the Milwaukee Water Works to charge its consumers, the principal changes being as follows:

(a) A sliding scale of meter and water charges was introduced to replace a uniform meter and water rate.

(b) The new rates were designed to raise approximately $500,000 additional annual revenue to meet the added cost of purification.

(c) The rates to the suburbs and other outside consumers average approximately 25 per cent above the city rates.

(d) The utility, in order to obtain the full return on the rate base to which it is legally entitled, was authorized but not required to raise the new rates in the city uniformly by not to exceed 25 per cent if it so desired.

(e) The annual fire protection charge to the city by the utility was raised from $80,000 to $187,000.

Three suburbs appealed to the courts to invalidate the order of the Commission, claiming that a municipally owned utility should not be permitted to include property taxes as an operating expense. A more far-reaching claim was that using political boundaries for determining classes of service and obtaining a higher rate of return from the outside consumers, was illegal. Recently the State Supreme Court ruled in favor of the City of Milwaukee in this important case and confirmed the Public Service Commission's ruling in respect to increased rates to customers outside of the city's boundaries.

Valuable Survey of Water Rates in American Cities

The Chicago firm of Barcus, Kindred and Co., specialists in municipal bonds, have recently made and published a "Survey of Water Charges" in representative American cities. All of the water utilities surveyed are municipally owned with the exception of the Indianapolis Water Co.

The survey reveals the following:

(1) The average resident in cities of 300,000 and larger pays 97 cents per month for water service and water use of 5,000 gallons per month.

(2) Median charges for 3,000 and 10,000 gals. per month are 67 cents and $1.88, respectively.

(3) Highest water charges for both household and commercial use are paid by San Francisco, the survey shows. Lowest are paid by Chicago. San Francisco residents are charged $1.74 monthly for 3,000 gallons, $2.43 for 5,000 and $4.16 for 10,000 gallons. Chicagoans pay a net domestic rate of 71 cents, regardless of quantity. In charges for industrial quantities, ranging from 15,000 to 1,000,000 gallons monthly, San Francisco ranks highest. Chicago is lowest.

(4) Three cities have a uniform rate per 1,000 gallons, regardless of the quantity consumed. These are New York with 20.1 cents, Jersey City with 12 and Chicago with 6.8 cents. In all other cities the rate is graduated downward as the quantity increases.

(5) Nine cities have a flat rate for domestic users. They are: Chicago, Baltimore, Pittsburgh, Buffalo, New York, Washington, C. D., Philadelphia and St. Louis.

(6) In the ratio of population to water users, the median for all 30 cities is 5.1. In general a high ratio indicates a high level of hotel occupancy and apartment building tenancy. A low ratio indicates a high percentage of home ownership. New York has the highest ratio with 11.9. Portland, Ore., has the lowest ratio of all cities with 3.4.

The survey presents a number of tables showing the various rates and charges for industrial as well as domestic water and other tables showing separate charges made for sewer service.

We understand that copies of this useful survey are available to water and sewage authorities without charge as long as the available copies last. If interested apply to Barcus, Kindred and Co., 231 South La Salle St., Chicago.

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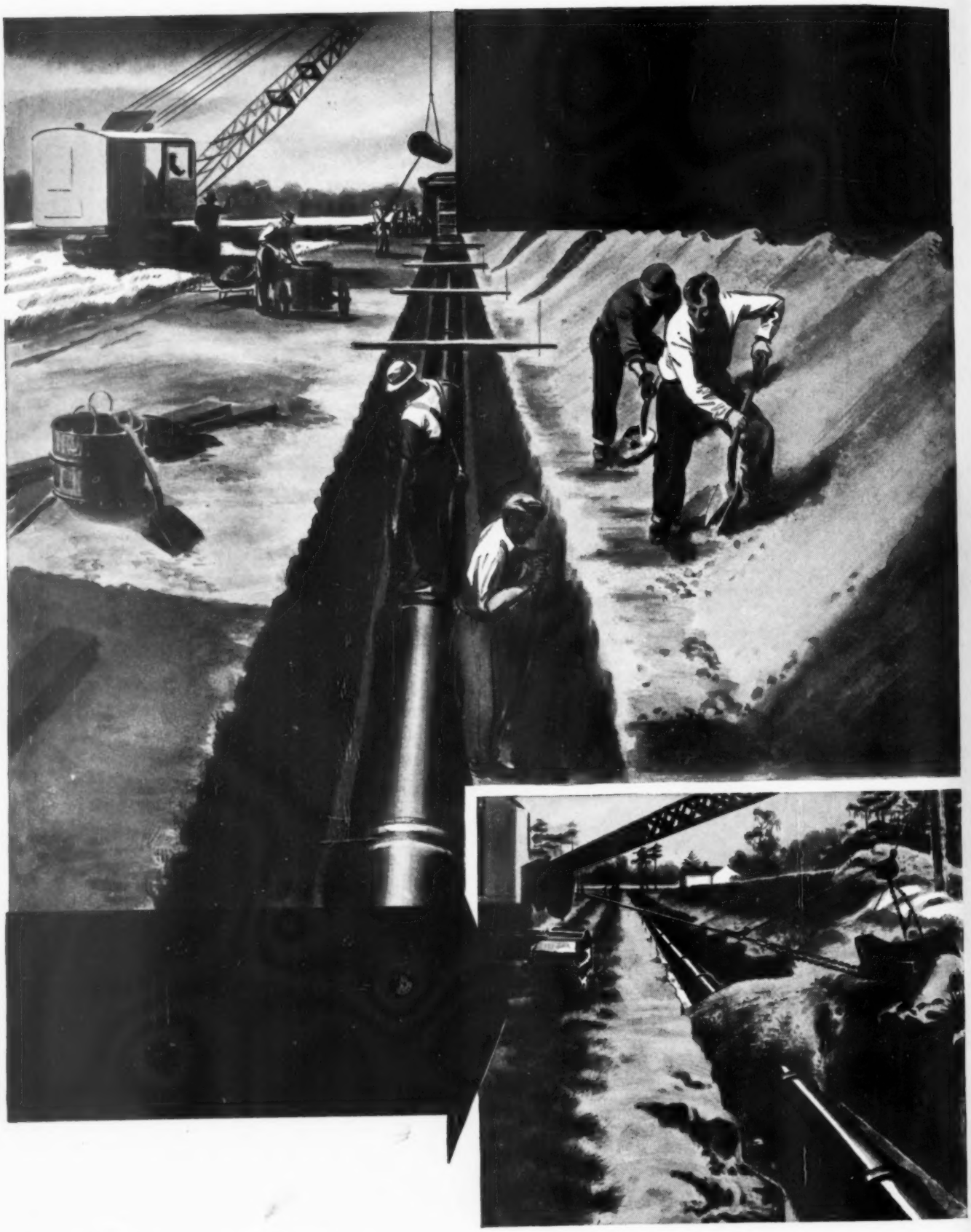

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NOW there are *four* major reasons for buying cast iron pipe. Three of them you have known for years: *longest life—lowest maintenance cost—salvage or re-use value.* The *fourth* reason is that cast iron pipe is now scientifically designed for specific laying conditions, in accordance with a new Law of Design.

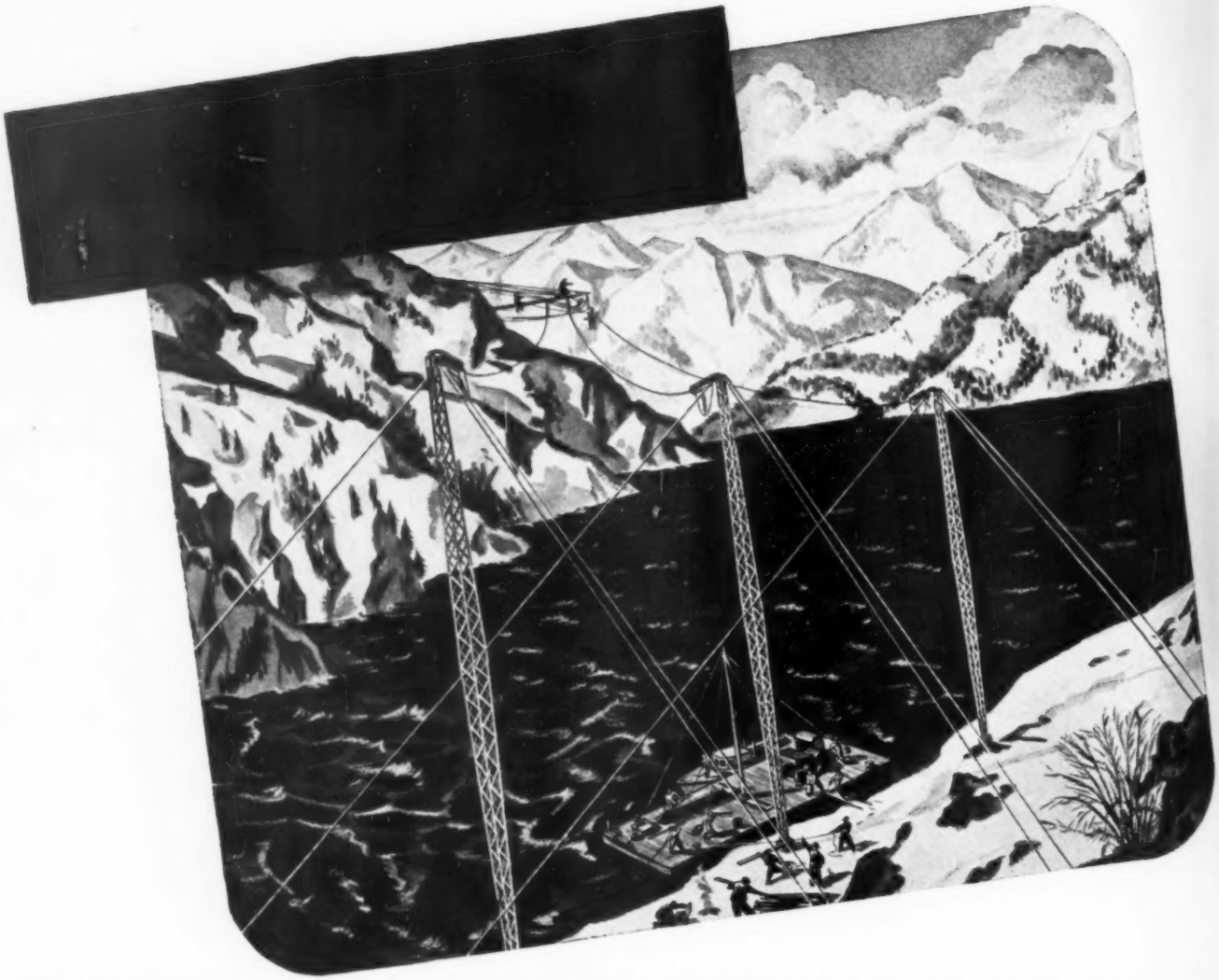
This new Law of Design was developed (in cooperation with our members) by consulting engineers and pipe users, under the auspices of the American Standards Association. It takes the guess out of determining proper weights and thicknesses of cast iron pipe in underground service. No more risk of *under*-guessing. No more *over*-guessing to be safe. You get the proper thickness for the service required.

Yes, this improved cast iron pipe is designed by experts to be tailor-made for the job. It is the *newest* development in pressure pipe with the *oldest* reputation for long life and low maintenance. All you have to do is decide how it should be laid. For example, your requirements may call for a depth of cover of 5 feet or 8 feet; a flat bottom trench or pipe supported on blocks; backfilling, tamped or untamped. Any of our members will tell you how to order cast iron pipe designed to meet any of these, or any other laying conditions.

It is obvious that this new scientific factor in pipe design will save thousands of tons of metal, with resultant large economies to pipe users in the water, gas and sewerage fields. Because of it, cast iron pipe—always lowest in cost per service year—becomes more economical than ever.

RESEARCH ASSOCIATION, CHICAGO

NO. 1 TAX SAVER



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Out of such gruelling tasks in the past have come hard, tough brain muscles, as well as high-tempered bodies. "Get the job done—fast!" has resulted in Ziebarth Construction being called in on an ever-widening list of heavy-construction jobs at different points in the United States; high-tension steel power lines, electrical sub-stations, airport lighting, personnel shelters, railroad signal installations, telegraph lines, sewage plants, water supply, pumping plants.

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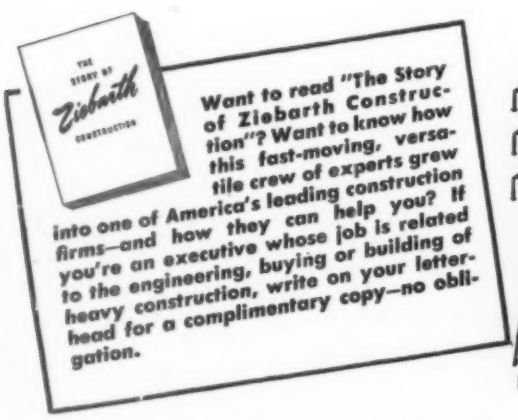


Want to read "The Story of Ziebarth Construction"? Want to know how this fast-moving, versatile crew of experts grew into one of America's leading construction firms—and how they can help you? If you're an executive whose job is related to the engineering, buying or building of heavy construction, write on your letterhead for a complimentary copy—no obligation.

ZIEBARTH

CONSTRUCTION

FRITZ ZIEBARTH—822 WEST ESTHER STREET, LONG BEACH, CALIFORNIA
RENO, NEVADA

N.E.W.W.A. PROTESTS TO W.P.B.*

Considering U-1 Order Too Restrictive for Safety in Water Works Maintenance, Follows Maine Association in Protesting to Director of War Utilities

At the meeting of the New England Water Works Association in Boston on March 18th, the new Preference Order U-1 of the Office of War Utilities (W.P.B.), which issued on Feby. 24, 1943, to supersede

Horace L. Clark
Superintendent
Water District
Sanford, Me.
Sr. Vice Pres.

H. W. Griswold
Deputy Chief Engr.
Water Bureau
Hartford, Conn.
Sr. Director

the P-46 Order, was considerably discussed in open meeting. It was apparent that the majority of plant managers present felt serious concern over paragraph f-2-i in the new Utilities Order which further restricts permissive inventories by defining as a reasonable minimum working inventory after March 31, 1943, for repair and maintenance of transmission, distribution and metering as one and one-third (4/3) of the dollar value of inventory in this classification existing during the last nine months of 1942 for the purpose of maintenance and repairs, and as operating supplies generally for transmission, distribution, fire service and metering.

After the discussion the following resolution was presented by Alan McAlary, Supt., Rockland-Camden Water Co., Rockland, Me., and passed by unanimous vote. It follows in full.

To J. A. Krug, Director,
Office of War Utilities,
War Production Board,
Washington.

Whereas, The provisions of paragraph (f) (2) of water utilities order U-1, which limits the practical working minimum of inventory to four thirds of the dollar value of items of the same class withdrawn from inventory during the last nine months of 1942, imposes a hardship on water utilities.

Whereas, This order penalizes those utilities which tried to cooperate with the War Production Board to the fullest extent and replaced as little material as possible during the last nine months of 1942.

Whereas, Most water utilities, with the exception of those affected directly by the war effort, made only absolutely essential replacements and postponed many border line projects.

Whereas, This postponed maintenance cannot be held to the very low levels of 1942.

Whereas, The former limit of 60 per cent of the December 31, 1940 inventory has brought inventories below the safe working minimum in many instances.

The New England Water Works Association respectfully requests that the War Production Board amend Preference Order U-1 so that water utilities may be allowed an inventory which will enable them to maintain a safe and adequate water supply at all times.

Maine Association Had Already Protested

Even earlier than this March 18th meeting operators in the Maine Association had filed protest. Evidence of the action came to us in the form of a copy of a letter of objection to this same restricting paragraph in Utilities Order U-1. This letter, addressed to the Director of the Office of War Utilities by the Defense Committee of the Maine Water Utilities Association, states in part:

"In most water plants this provision under f-(2) limits the minimum practical working inventory to the vanishing point, as no work was done in 1942 except that most urgently required.

"Since replacements of obsolete and depreciated plant equipment have been suspended in most systems during the past year, in accordance with the 'Patch and Pray' policy so ably defended by you at the Chicago Conference of the A.W.W.A. in June, 1942, many more 'prayers' will have to accompany the patching in future months, as portions of water systems become weaker and weaker and can not be replaced in advance of actual breakdown because of inventory and procurement limitations.

"We respectfully request that these critically limiting provisions (f)-(2) be amended."

The Water School

The March meeting was preceded by the Water Works School, before which Professor George E. Russell gave another of his "Hydraulics" lecture series, this one being on "Weirs—Their Use and Abuse." After presenting the basic principles in the construction and use of weirs of various styles and the "do's and don'ts" in the use of weirs, Professor Russell said that it was conceded best practice to have the weir to be used calibrated by some hydraulics laboratory if reasonable accuracy was to be of real consequence in use of the weir.

Supts. and Chemists Session

The superintendents and chemists in a joint session heard Fred. A. O. Almquist, Engineer, Conn. State Dept. of Health, discuss "Disinfection in Water Supply Operations," in which particular emphasis was placed on emergency disinfection

John C. Knox
Mass. Dep't Health
Boston
Chairman
Program Comm.

Fred Almquist
Conn. Dep't Health
Hartford
Joint Session
Chairman

procedure and sterilization of reservoirs, tanks and mains. He presented the basic rules of disinfection with chlorine and chlorine compounds and discussed the several compounds available on the market and feeding equipment. A display of equipment was available for inspection and demonstrations by Mr. Almquist were made of the residual chlorine test in ordinary and in super-chlorination such as is em-

*[Ed. Note: It is regretted that this account of actions taken by the New England and Maine Associations missed our March issue only by a matter of a few hours of air-mail delay. Consequently there was a lack of tie-in with the editorial on this same matter which ran in our March issue.]

ployed in main sterilization. For the latter operation he cited the minimum chlorine dosage (which he showed how to calculate) should be such as to leave 50 p.p.m. of residual active chlorine in the water standing in contact with the main interior for 12 hours at least. When the

Principal Speakers

Sherman Chase
Metcalf & Eddy
Engineers
Boston

Ross Nebsoline
Consulting Engr.
Ranney Corp'n.
New York

main is emptied the water should contain at least five parts of residual chlorine or else the job should be repeated. In some detail and step by step procedure, Mr. Almquist went through the calculations required in preparing solutions of the various hypochlorites available, from bleach solutions to the high-test dry hypochlorites, "H. T. H." and "Perchloron."

New Trends in Ground Water Development

Following the Luncheon Session, the first technical paper was a well prepared discussion of "**New Trends in Ground Water Development**" by Mr. Ross Nebsoline, Consultant to the Ranney Water Collector Corporation of New York City.

After a preliminary discussion of the basic laws of ground water flow and the gravel pack well as a major step in improved deep-well construction, the most interesting part of the paper was that describing the "Radial Well," of which considerable has been heard in connection with industrial water supplies, in particular since the war began and great volumes of industrial water came into demand. The radial-well of the Ranney System was described and pictured with lantern slides as a large diameter dug well into which the water flows through many horizontal driven wells below the water table level and radiating out like the spokes of a wheel—only there might be more than a single wheel of spokes at various levels and staggered. Each of these so-called spokes is in itself strainer equipped and developed so as to make of it a gravel-pack type of gravity well, flowing free into the hub or caisson. In this arrangement a single pumping unit draws from as many of the horizontal feeder wells as may be in service and water may be taken from the upper or lower stratas as desired.

Methods employed in constructing such "Radial Wells" were pictured on the screen. The first of these wells was put in for the London Water Board in 1934. Of the American installations, Mr. Nebsoline briefly described the largest at the Charleston, Ind., Ordnance Plant on the banks of the Ohio; another in Ohio (Timken Roller Bearing Co., Canton, Ohio); and a remarkable shallow 25 ft. installation of one of the Du Pont plants in New Jersey. This latter installation, only 25 ft. deep, had yielded volume exceeding expectations from the area; a water of 80 ppm. total hardness; chlorides of 12 ppm., and low temperature water. The most surprising revelation was the bacterial average of 36 total count and coli consistently absent to the marked surprise of the State Health Department. In itself the remarkably low chlorine demand of 1 lb./mg. (0.12 ppm.) gave evidence of the natural purity of the raw water and freedom from iron, sulphur or organic matter.

Mr. Nebsoline said that units in actual service ran from yields of 250,000 gpd. to 25 mgd., and then described the hypothetical unit as having a center caisson sunk 60 ft., from which 900 lineal feet of intake "spokes" would radiate. The screen sections would total 200 linear feet. There would be three vertical submerged centrifugal deep well pumps and all at a cost of $80,000, compared with the cost of $50,000 for deep gravel packed wells at Houston, Texas, and elsewhere. The operating and amortization costs combined would result in a naturally filtered low temperature water put in the distribution system at 1½ cents per 1,000 gals. Actually the construction costs had varied between $10 and $20 per 1,000 g.p.d. capacity in average conditions.

In citing the history of the Charleston, Ind., installation on the banks of the Ohio River, Mr. Nebsoline presented draft and water quality graphs revealing a dropping in hardness from 317 ppm. in the beginning to 190 ppm. in early 1943. The temperature line showed a gradual rise from 52 min. to 67 max. (F.), the high being in late Fall and the low in early Summer. This compared with river temperature range of 37 min. to 86 max. (F.). In reply to inquiry, Mr. Nebsoline said that the temperature and hardness curves indicated infiltration draft from the river without question. Also that there had been no diminution in the well yield with continuously excessive draft. Fortunately, the ratio of river infiltration water to ground water had not been sufficient to critically raise the water temperature and the closest approach to river temperature was the 67 to 86 degree figure, or a 19 degree lower well supply for cooling purposes at maximum temperatures.

Mr. Nebsoline closed by making a plea for greater consideration of ground water as a source of supply and more adequate studies of the chemistry of sub-surface waters, since there was at present too much gambling and too sparse exact knowledge and scientific data pertaining to what happens to the chemical and physical quality of water in the ground.

In the discussion ensuing it was emphasized that the matter of iron content was still a baffling problem, since two wells only a matter of yards apart would often yield utterly different water in respect to iron and carbon dioxide content, Sanford, Me., being cited as a case by the

1 2 3 4 5

(1) *Samuel M. Ellsworth*
Consulting Engineer
Boston

(2) *Everett C. Howe, Ass't. Treas.*
Cement Lined Pipe Co.
Lynn, Mass.

(3) *Major Howard H. Potter*
U.S.P.H.S.—O.C.D.
Augusta, Me.

(4) *Mark F. Croker*
Sup't. of Production
Newton, Mass.

(5) *Eban F. Lufkin, New England Manager,*
Pittsburgh-National Meters, Boston

Chairman, who has had this iron problem to contend with and solve "by guess and by God," one might say.

Measures for Control of Red Water and Tuberculation

This topic was covered in an interesting recounting by E. Sherman

Roger W. Esty Superintendent Water & Sewerage Danvers, Mass. (His discussion interesting —as always.)

Alan F. McAlary Sup't. and Treas. Rockland Water Co Rockland, Me. (Introduced Resolution of Protest to W.P.B.)

Chase of Metcalf and Eddy, Boston, of experiences with the system of Falmouth, Mass., over a period of years.

He told first of studies conducted by Stuart Coburn, chemist of the firm, in the direction of corrective treatment of the water in which silicate of soda, lime and soda ash had been involved. The most practical of the schemes and the most effective and economical seemed to be lime treatment to maintain a pH value of 9 or slightly higher, raising the natural hardness of 10 ppm. to 20 ppm. Follow-up inspections revealed that the lime treatment had effectively checked red-water and consumer complaints but tuberculation had not been controlled sufficiently. Ammonia-chlorine treatment had been introduced only in 1941 and observations on tuberculation control were not sufficient to draw a conclusion.

Taking all things into consideration, it was decided that rejuvenation of the old mains was the overall most practical solution and Mr. Chase described the job of cleaning and cement-lining many miles of the Falmouth pipe system in place with the Tate Process, beginning with 7,000 ft. of 4 to 8 in. mains as an experimental project, followed later with 25,000 ft. of 8 and 10 in. mains, or 32,000 ft. to date. The respective costs per foot for the three jobs being 64 cts. for the 8 in. and 76 cts. for the 10 in. pipe.

As to the effect of the cement in water quality, Mr. Chase revealed that the high initial hardness had gradually settled to a 20 ppm. increase after 15 weeks and now after 7 months the continuing increase of 10 ppm. still existed.

[Interesting that the hardness pick-up of 10 parts after 7 months is exactly that necessary increase with lime treatment to bring the water to a balance wherein its aggressivity reduction corrected red-water complaints. Significant?—Ed.]

Mr. Chase reported that the net result from the lining operation had been a cleaner water and pressure improvements due to the raising of the C-value from 58 to 125 when calculated on the original pipe diameter. Mr. Chase, in summary, said that the rejuvination of water mains in the ground by cleaning and lining offered great promise and deserved more study and consideration.

Roger Esty, Supt. of water and Sewerage, Danvers, Mass., commented on the fact that now seemed an ideal time for water works managers to consider cleaning and lining existing mains because there were no critical materials involved to speak of and but little manpower required.

Mr. Esty told of having relined 6,000 ft. of mains by the Tate Process at a cost of one-third to one-fourth of cost of replacement with new pipe. He liked to think of the job now as one continuous concrete tube without joint crevices. The job should correct the trouble of low pressures due to tuberculation creeping over the inlet to the corporation cocks. When the job was done, all weak services were replaced with new ones and all gates overhauled. To realize a sustained C value of 125 or even 100 gave him a very satisfied feeling. He couldn't understand why more consideration wasn't being given to this scheme right now while there was little opportunity to do much in the nature of betterments because of the critical materials situation.

In reply to a question, someone from Falmouth stated that the 76c per foot cost for relining 8 and 10 in. pipe in the ground included every expense other than replacing paving at entrance cuts for the machine and renewing corporation cocks.

The meeting closed with a discussion of the U-1 order and passing of the resolution quoted in the first part of this report.

WPB Suggests Means of Expediting Essential Sewerage Projects

Under the new Controlled Materials Plan (C.M.P.) it is suggested by the Governmental Division of the the W.P.B., Temporary E Bldg., Washington, that preliminary drawings and approximate lists of materials needed for essential projects of federal, state, county and municipal sewage works be as early as may be permissible.

After so doing consultation with W.P.B. is urged in order that the needed materials under the new Materials Control Plan may be planned for at least 90 days in advance so that allocation may be sought ahead of actual need and avoid delays or postponement.

In this way the applicant will be informed of the latest regulations regarding use of specific materials and possible necessary substitution arranged for in advance of completing the final drawings and specifications required with the formal application for approving the project and granting priorities. The whole idea behind the preliminary consultation is to avoid the necessity of any major changes in the final (completed) plans and specifications, entailing needless expense and delays in getting the project under way. It would seem a very sound procedure for engineers and municipal authorities to follow as is usually done in working with State Health Departments in securing approved plans and specifications before proceeding with permanent (completed, drawings and specifications.

1 2 3 4 5 6

(1) *Roy Replogle, New England Mg'r. Warren Pipe Co., Boston*

(2) *Chas. J. Crump, Distr. Engineer, Bourne Water Distr., Monument Beach, Mass.*

(3) *N. F. Glidden, Jr., Vice-President, Ranney Water Collector Corp'n, New York*

(4) *Kenneth F. Knowlton, Sup't. Purification, Salem-Beverly Water Board, Beverly, Mass.*

(5) *Joseph E. Tracy, New England Mg'r. The Pitometer Co., New York City*

(6) *Edw. D. Case, President The Pitometer Co., New York City*

SETTING AND HOUSING WELL PUMPS

Some Economic and Safety Considerations

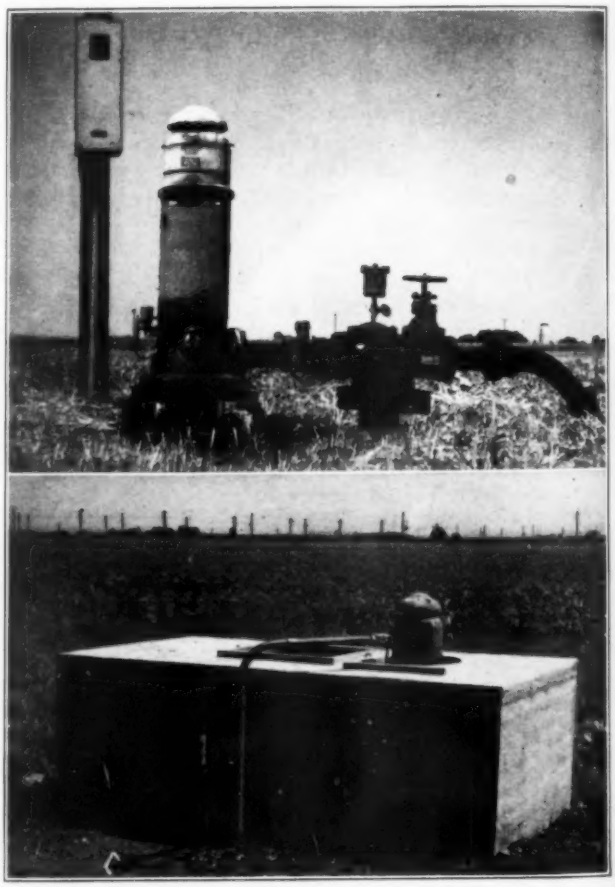
By JOHN A. GOETZ
Superintendent
DEPTS. OF WATER & SEWERAGE
MATTOON, ILL.

The Author

Here is an article that constitutes ample proof that the old Chinese axiom that "One picture is worth a thousand words" still holds water. Or, if stated in language understood by stock brokers, perhaps it should be said that one picture will allow the squeezing out of a lot of "water" from the text of any article.

However that may be, author Goetz has spared himself much writing, and the reader a lot of needless reading, by telling his story about 90% with pictures and drawings. It may prove a "nightmare" to our make-up department because of so few words to balance the better than two pages of illustrations. Outside of that slight weakness of the the method of "saying it with pictures," we present this article as a striking example of how it can be done.

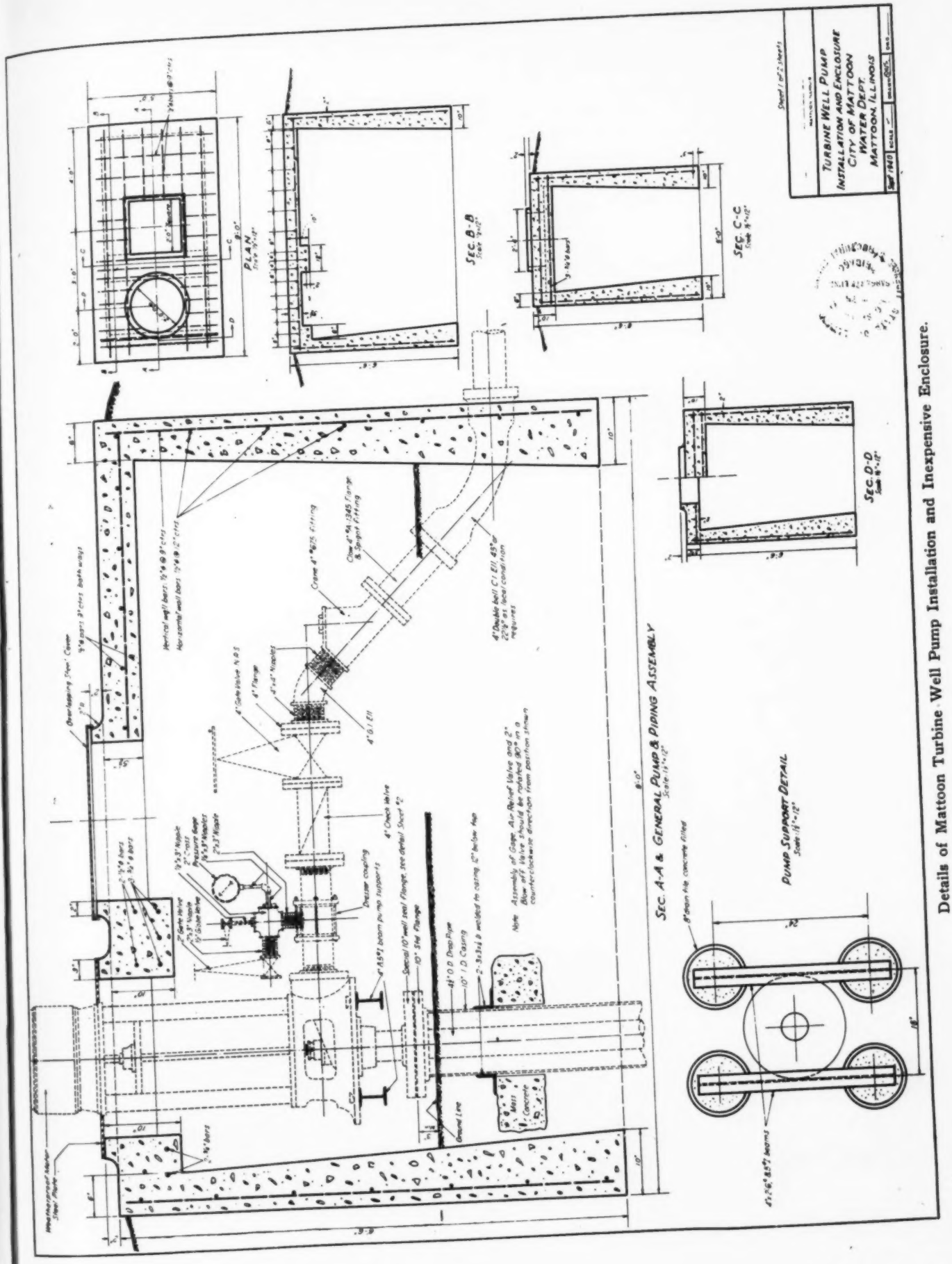
NO matter how worthy, it is generally essential that important machines be protected from the elements so that continued functioning can be expected. To a high degree this is true for those pumps upon which the community must rely for its supply of water. Where wells of fairly large, sustained capacity can be developed, the question of housing and setting of pumps is of minor consequence, but in areas where



Mattoon's Pumping Stations of Yesterday and Today.

This Elaborate and Expensive Pump-House Does No More Than the Simple Enclosure Pictured on the Right.

Here Is the Pump Setting of Today and (Below) All That Is Necessary in the Way of an Enclosure.



Details of Mattoon Turbine Well Pump Installation and Inexpensive Enclosure.

only small yields are obtainable, and when in addition such wells progressively cease to produce water in quantity profitable to pump, then the problem of setting pumps and housing them becomes a matter of considerable economic consequence. In addition, the health and safety of the community may be at stake as the result of defective preparations and practices in the selection and installation of deep well and pumping facilities.

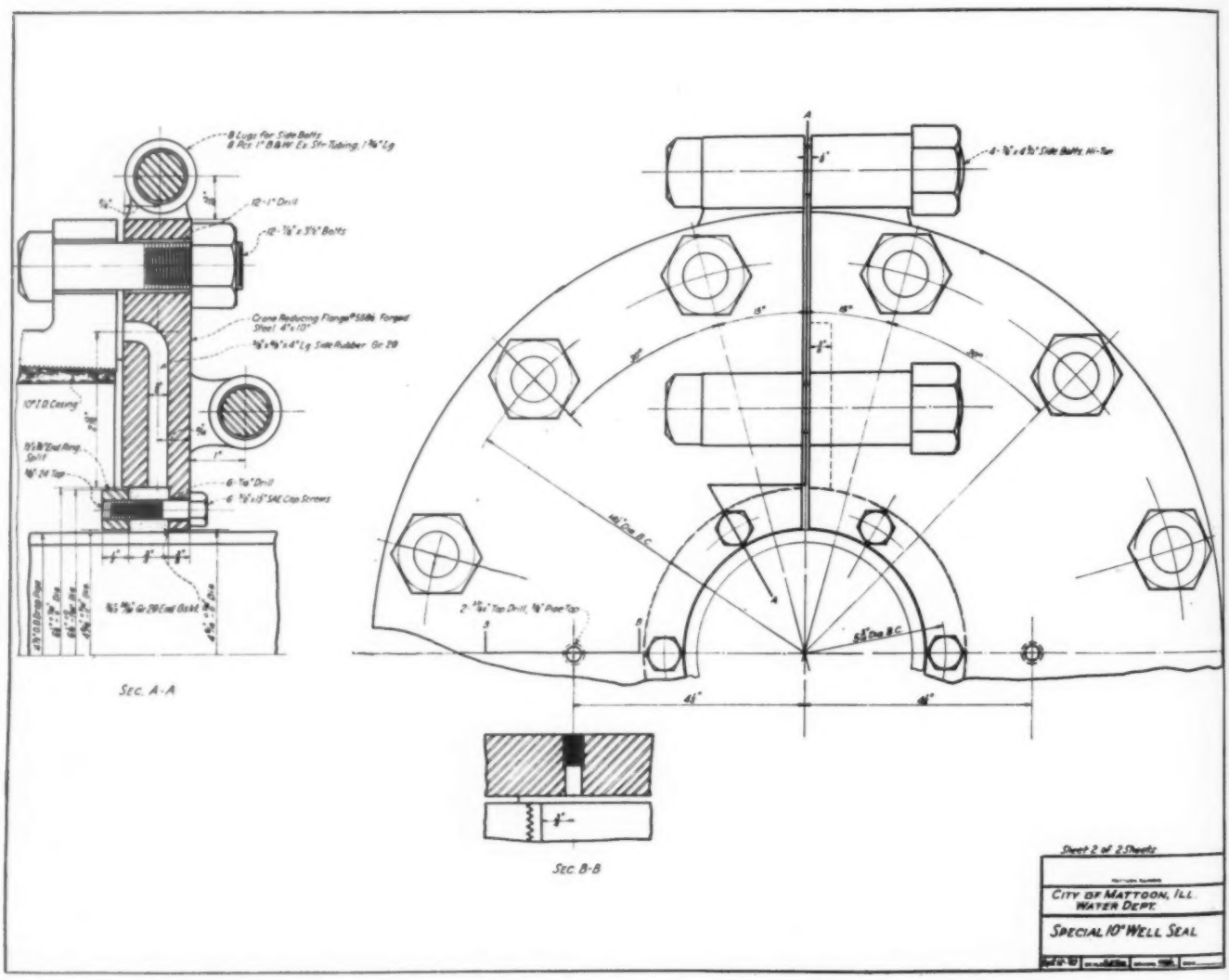
The old displacement pumps, first driven by steam and later operated by electric power, with monstrous heads, gears, air chambers and large power units, not only required a good sized building with an immense derrick for servicing it, but it also required ample protection against the winter's cold to prevent damage. Such housing is expensive; and, if the well became unproductive the station might well become an almost total loss. The turbine pump with its weatherproof motor does not need an elaborate house, and were it not for sanitary considerations, possible contamination of the well, as well as incomplete protection of pump parts, oiling, etc., underground discharge installations, without any enclosure for pumphead, would be practical. Sizes of wells and pumps matters little, for the dimensions can be increased or decreased to fit all cases.

The writer has "heired" a variety of old equipment on a dozen wells and when the time came to develop new wells, decided to make an effort to devise pumps and provide setting and housing to afford complete protection at minimum cost. The accompanying drawings and pictures fairly well show how this is achieved.

Some Improvements And Economies

With the exception of the well seal, which was specially designed (see detail drawing), all fittings, valves, electrical connections, supports, etc., are standard, as are also the pumps. To extend the base for the motor required only a short length of pipe, flanged top and bottom to fit base and motor, and a longer length of drive shaft. In one case, the writer has had such an extension made locally. Some of the pumps have another bearing in the extension to prevent "whipping" but if the upper bearing in the pump is near the regular pump head, this is unnecessary. In case of shut down during cold weather provision is made to drain pipe lines underground to prevent freeze-ups.

During an operation period of two years, these pumps have functioned as well as the conventional settings in expensive houses. Temperature of the well water is high enough to keep out frost, so lubrication is no more a problem in winter than in summer. The simple and inexpensive concrete enclosures (see photograph) should be large enough to afford space for servicing and dismantling, when necessary. Electrical devices are housed in weatherproof boxes on a pole as near as practical to the pump motor head, with lead sheathed cable in the conduit to the motor.



Details of Special Well Seal Developed in the Mattoon Water Department.

PROGRAM FOR A.W.W.A. CLEVELAND CONFERENCE DEVELOPING

THE preliminary draft of the technical program for the A.W.W.A. Conference on War Winning Water Works Operations to be held in Cleveland, Ohio, June 16-18 has just been released by the Association.

Although subject to revisions and further amplification the program as it now stands is sufficiently well developed to justify study.

An innovation in this year's program for the curtailed Conference is the evening program on Wednesday. The topic is one of importance to all water works men—"The Relation of Public Water Supply to the Post War Construction Program"—and is to be discussed by A.W.W.A.'s two most brilliant speakers. One speaker is A.W.W.A.'s president, Abel Wolman, and the other, Col. Willard Chevalier, whose address before the 1941 Convention in Toronto is long to be remembered.

A speaker of repute from the other side of the Atlantic is England's Arthur Collins, who will discuss "The War's Effects on Municipal Finance."

A part of the program which should prove both interesting and valuable will be those prize papers of Superintendents who will reveal in brief statements those things which each has done in the direction of helping win the war and solving local operating and maintenance problems via the "Save, Stretch and Share" route. In this competition every Superintendent in the country is invited to submit schemes and methods developed and/or employed during this war to maintain the most service with the least use of critical materials. The paper (or even a letter will answer the requirement) should be entered without further delay by addressing it to A.W.W.A. headquarter's office at 500 5th Ave. The five winning papers are to be read at the Cleveland Conference on Wednesday afternoon, June 16th.

A study of the program which follows will reveal much that is of especial interest at this time—Manpower, Selective Service, Job Classifications, Social Security, etc.

The program in detail, as it stands subject to last minute changes, follows:

PRELIMINARY PROGRAM A.W.W.A. CONFERENCE ON WAR WINNING WATER WORKS OPERATIONS

(Subject to Revisions)

TUESDAY (JUNE 15) AFTERNOON

General Session on Plant Management

The Quarter Century's Water Supply Development in Cleveland
A. G. Levy — L. A. Marshall
M. C. Simmermacher

Water Supply Practice in Army Training Centers
L. H. Kessler — Arthur O. Tomek
Major V. Bruce Sundstrom

Labor Relations—A Symposium
Walter S. Byrne — Carl A. Eberling
(With others to be added)

Water Purification Division

Committee Reports

Loadings and Capacities of Water Treatment Plants
A. Clinton Decker

Control of Chlorination
C. K. Calvert

Two New Developments in the Water Conditioning Field
S. B. Applebaum

The Extent of Use of Activated Carbon
(Review of the U. S. P. H. S. Survey)
E. A. Sigworth

War Problems in the Examination and Treatment of Water
A. M. Buswell — H. E. Hudson
A. G. Gore — T. E. Larsen
A. C. Wiese

Problems Confronting the Water Purification Division
A discussion opened by Marsden C. Smith, Chairman

WEDNESDAY (JUNE 16) MORNING

General Session

Civilian Defense and Mutual Aid—A Symposium
Maj. G. E. McCallum — Earl Devendorf
J. Elliott Hale — Maj. Frank W. Jones
Maj. William H. Cary, Jr.

Fundamentals of University Hydraulic Education
Samuel B. Morris

The Plans and Policies of the Office of War Utilities
J. A. Krug (W. P. B.)

Administrative Practices of the Water Division—Office of War Utilities
A. E. Gorman (W. P. B.)

WEDNESDAY (JUNE 16) AFTERNOON

General Session

(Cast Iron Pipe)

The Water Department's Responsibility for Damage Resulting from Broken Mains
Thos. H. Wiggin

Studies of Coating Materials for Cast Iron Pipe
L. G. Lenhardt

Discussion by
Thos. H. Wiggin — Robert C. Wheeler
James T. McKenzie — Leonard P. Wood

New Materials for Post War Use in the Water Works Field
W. Victor Weir

Experimental Studies of Saran as a Service Line Material
F. M. Dawson — A. A. Kalinske

Finance and Accounting Division

Social Security Legislation—Pending and Proposed
Dale Maffitt

Commission Controlled Water Department Operation
Wm. Storrie (Ontario Practice) — L. A. Smith (Wisconsin Practice)

How Can a Fair Comparison of Water Rates Be Made?
Discussion led by
W. Victor Weir — M. F. Hoffman

WEDNESDAY EVENING

Special Session

Public Water Supply—Its Relation to the Post War Program
Willard Chevalier — Abel Wolman

THURSDAY (JUNE 17) MORNING

General Session

A Study of Job Classifications and Titles in the Municipal Water Works Field
Albert R. Davis

Manpower and Selective Service Problems
P. B. Niles

The War's Effect on Municipal Finance—British Experiences
Arthur Collins, England

Steel Pipe Session

Report of Current Activities of the Steel Water Pipe Committee
(W. W. Hurlbut, Chairman)

A. W. W. A. Manual for Design and Installation of Steel Water Pipe Lines
(a) Outline of Design Factors
Russell E. Barnard
(b) Outline of Installation Procedure
Wm. W. Hurlbut

Field Welding of Steel Water Pipe
H. Arthur Price — G. H. Garrett

Economics of Mechanical Joints
H. P. Boncher

THURSDAY (JUNE 17) AFTERNOON

General Session on Water Purification, and Management and Operation

Symposium—Fluorides and Dental Health

The Role of Sodium Fluoride in Potable Water
Dr. H. T. Dean, U. S. P. H. S.

The General Significance of Dental Deficiencies
(By a medical authority to be chosen)

What Are the Responsibilities of Public Water Supply in Correction of Dental Deficiencies
Dr. Abel Wolman

A Program of Water Treatment to Correct Fluoride Deficiency
Dr. David B. Ast

Superintendents' Prize Papers
A series of five papers to be developed in competition. Titles and authors not yet available.

Experience with the Use of a New Type of Concrete Pressure Pipe
W. W. DeBerard

Laying Concrete Pipe
L. R. Howson

FRIDAY (JUNE 18) MORNING

Joint Session of Plant Management and Finance and Accounting Divisions

The Use of Motion Pictures in a Public Relations Program
E. P. Stewart — H. S. Morse
Chas. F. Alfke — W. V. Weir

The Deluge—A Radio Play
(Written by A. F. Dappert, and acted by a group of well-known water works men with some of the fairer sex in the cast.)

Water Purification Division

A Symposium—Water Quality Standards

The Dominion of Canada Standard
Norman J. Howard

The U. S. Public Health Service Standard
From the State Sanitary Engineers Viewpoint
F. H. Waring

From the Plant Group Viewpoint
G. D. Norcom

From the Operators' Viewpoint
R. F. Goudey — C. K. Calvert

Resume
C. R. Cox — J. K. Hoskins

"Waterboys" at Gas School

"Prof." Braidech, who has recently been made Utilities Gas Officer for Greater Cleveland, attended the Gas Specialists' School conducted at Purdue University by the Chemical Warfare Service. He bumped into the three other "water boys" and had their picture taken together while on a 10 degree below field reconnaisance jaunt.

"Matt." reports that the instruction was very complete and "chuck full of good information."

(From left) "Bill" Hatfield, Supt. Decatur (Ill.) Sanitary District; Geo. Turre, San. Engr., Denver (Colo.) Water Board; "Matt" Braidech, Prof. San. Chemistry, Case School of Science, Cleveland; John McCarthy, Chemist, Racine (Wis.) Water Dept.

NEW W.P.B. ORDER PROTESTED BY N. Y. WATER OPERATORS

A.W.W.A.'s New York Section, After Protracted Discussion of New U-1 Order, Telegraphs Plea to Washington for Revision of Endangering Stringencies

A Report by
GEORGE E. SYMONS
Associate Editor

WITH an attendance of 192 persons, the Wartime Conference of the New York Section of A.W.W.A. in Syracuse, March 25th and 26th, was no ordinary meeting.

Operation of water supplies in wartime under government regulation held the spotlight during the entire two day program, while Lloyd Nelson and other W.P.B. representatives from the Office of War Utilities (Water Production Section) were plied with numerous questions, resulting in much clarification and new information concerning operations, purchasing and inventory requirements under the new W.P.B. U-1 Order governing utilities. At the end of these protracted discussions it was voted that the following telegram be addressed to J. A. Krug, Director, Office of War Utilities—

Hugh S. Dewey Mgr., Western N. Y. Water Buffalo, N. Y. (Retiring Chrm.)

Wallace T. Miller Supt. of Water Ossining, N. Y. (Incoming Chrm.)

"The New York Section of A.W.W.A., meeting in Syracuse, N. Y., after full consideration and detailed reports of the effect of U-1 regulations on water utilities necessary minimum wartime operations and assurance of service, unanimously requests the raising of civilian deliveries and withdrawals to at least former P-46 allowances."

This wire was signed by Hugh S. Dewey, Chairman and J. M. Diven, Jr., Acting Secretary.

Meeting Opened With Syracuse Water Movie

The meeting was opened with a showing of Syracuse's splendid technicolor films titled—"The Life Blood of a City." Elon Stewart, Water Engineer, Syracuse, presented a running commentary while the films pictured all of the steps and methods used in obtaining and maintaining a good, pure and wholesome water supply for Syracuse. This picture, taken by a member of the Syracuse Water Department has served in doing a highly useful educational and public relations job in being shown many times and in various parts of Syracuse.

Kohlhepp on Inventories

C. E. Kohlhepp, Chief, Inventory Control Section, Power Division, Washington, presented his talk on "The Administration of Priority Order U-1 as Applied to Inventories of Excess Water Works Materials." Pointing out that surpluses were significant only in terms of time, transportation, and manpower, Mr. Kohlhepp gave some reassuring advice to water works operators. "Don't worry about W.P.B. orders seeming to be excessively burdensome," said the speaker, "and don't interpret orders contrary to common sense."

"The order U-1 (in effect Mar. 31) has certain compulsions in it and the following three deserve particular mention. First, to make sales to other utilities of any or all real surplus materials; second, to ask W.P.B. where to buy emergency materials before buying anything; third, to obtain a decision from W.P.B. whether material need is sufficiently urgent to warrant its being sent from Buffalo to Long Island, for example."

Mr. Kohlhepp concluded with the request that operators help W.P.B. to rectify mistakes and to maintain control of their common sense in interpreting orders. In the discussion which followed, several questions were directed to the aforementioned Mr. Nelson, who with Mr. Kohlhepp added comments to the effect that W.P.B. is trying to have O.P.A. issue special regulations to utilities to allow buying and selling without restrictions, except as to cost plus storage plus overhead at not more than 10 per cent. Nelson also commented that there are 13,000 water supply utilities which must buy under order U-1 but only in cities of over 50,000 must surplus stock be reported. In as much as this reporting will reach only 45-60 per cent of the inventory, it is likely that the limiting size of the city will be lowered, but not to include the small villages.

New Officers and Awards

Announcement was made during lunch that the Board of Directors had selected Wallace T. Miller of Ossining and Allan H. Rogers of Garden City to the Chairman and Vice Chairman respectively for the ensuing year. These selections were unanimously approved. Mr. Elon P. Stewart of Syracuse was elected to the regular five year term as a Trustee.

Earl A. Devendorf Asst. Dir., Div. San. N. Y. State Dept. Health (Voted the Fuller Award)

John M. Diven The Leadite Co. New York City (Secy. in Blanchard's absence)

The Fuller Award Committee, through its Chairman, W. H. Ogden, announced that the Award for 1942 had been made to Earl Devendorf, Asst. Dir., Div. of Sanitation, N. Y. State Dept. of Health, for his noteworthy work as State Water Coordinator. Mr. Devendorf has also been voted A.W.W.A.'s Diven Medal for the same work, as announced in our February issue.

Devendorf and Luce—On Mutual Aid and Central Inventory

In the afternoon session, Mr. Devendorf led off with a brief review of "The Present Status of the New York State Mutual Aid Program for Water Supplies." Paying tribute to the cooperation of all the operators who had made the program a success, Devendorf suggested that "we go slow on another state-wide inventory until W.P.B. has clarified its position somewhat. Mr. Kohlhepp's statement about shipping from one end of the state or nation to another is the kind of clarification we need."

A. T. Luce, Chairman of the Section's War Inventory Committee, New York City, gave a rather complete discussion of Mr. Devendorf's remarks. Among the points brought out was the fact that only one-third of the questionnaires had been returned, but that these listed a substantial amount of equipment. "It's a fine thing to help one's neighbor," said Mr. Luce, "and such cooperation reduces the need to carry a large inventory of odd items, and," he continued, "it is our hope that Washington will heed the New York suggestion to take inventory in cities down to a population of 5000." One instance of the effectiveness of this inventory was cited in the case of an odd size 14 inch valve which had been in stock for years. When it appeared listed in the surplus inventory, there followed five orders for it almost immediately.

J. W. Ackerman Water Prod. Sec. Power Div., WPB (Dean of N. Y. Operators)

Elon P. Stewart Div. Water Engr. Syracuse, N. Y. (New Trustee)

It was following Mr. Luce that Lloyd Nelson was again called on to answer innumerable questions. He was able to explain a number of misunderstandings concerning Order U-1, particularly in reference to problems for extending services to new customers. Nelson stated that it is not permissible to make such connections without special permission. He also remarked that operators should distinguish between Mutual Aid and Surplus Inventory. The former is for the *loan or exchange* of materials during emergencies, while the latter is for the purpose of making available for actual sale material and equipment, without intent of replacement when sold.

Regarding the extent to which these inventories should be reported, Mr. Nelson said that 236 cities above 50,000 population represented about 70 per cent of the total population served by water plants, and inventories of smaller plants would not turn up a great percentage of the total water supply equipment. But, Harry Jordan believes the problem involves the need to take in the smaller plants in order to make them realize that they, too, are a part of the war effort. Jordan suggests that these smaller plants should preferably report to the State Coordinator rather than to Washington direct.

Nelson also commented on the new Controlled Materials Plan the initials of which some wag had christened "Confusion Made Permanent." For maintenance operating and repairs water supply utilities will operate under order U-1 and C.M.P. does not affect them. For all construction C.M.P. is in effect. Even so, the application is only to steel, copper, aluminum, and other metals, except those items in Class B. This Class B list was issued on Dec. 21, 1942 and contains a large number of items and materials needed by water works.

The Mutual Aid Training Program in Zone 22 was described by Elon P. Stewart, Zone Coordinator, in Syracuse and vicinity, including Oswego, Cortland, and Auburn. With a "faculty" consisting of the Zone Coordinators and the State Department of Health men, a course of 32½ hours was given. Two hundred fifty nine men enrolled. Of these 158 were water works men and 121 were auxiliaries. It was required that the "students" complete 28 hours of work in order to take the examinations. In all, 136 men completed the course, one of whom was the bus driver who transported the men of the area to the "schoolroom." Mr. Stewart said that much of the credit for the success of the school belonged to "Herb" Wagenhals, Deputy coordinator and Dist. Engineer of the N. Y. Dept. of Health.

J. Walter Ackerman, formerly of Watertown and "dean of water works men" in New York State, reviewed the birth of the Water Production Section of the Power Division of W.P.B. in his talk on "Cooperation of the Water Production Section with the Water Supplies of the United States to Aid in the War Effort." Although listed as an analyst, Mr. Ackerman actually reviews the engineering involved in applications, and he offered the following advice. "If you want to know what has happened to an application sent in before the Water Production section was formed, write a letter sending a copy of the original letter of application and the numbers of the application. The attitude of the Section is to be helpful and spread materials as far as possible, always remembering that the war comes first."

Mr. Ackerman requested that Lloyd Nelson add further comment on this work of the Water Production Section, and Nelson said "This Water Section covers all water problems, so don't send inquiries to the Governmental Division." (In the case of sewerage matters the reverse is the case and the Governmental Division now has a special Sewerage Section, established to perform a service in the sanitation field such as the Water Section has performed in the Water Supply field.—Ed.)

H. H. Wagenhals Dist. Engr., N. Y. State Dept. Health Syracuse

F. W. Gilcreas Assoc. San. Chem. N. Y. State Dept. Health (State Gas Consultant)

Capt. F. J. Maier, of the U.S.P.H.S. in New York City, read a paper on the Protection of Water Supply Systems, cautioning before he read, that it was not possible for him to divulge much information on this type of protection, and such information as he could present for publication.

A round table discussion held at the end of the session raised the question of losses of trained personnel to the army, and Mr. Dappert of the State Dept. of Health explained the method of deferment requests and stated that the letter of request should cite Maj. Gen. Hershey's letter regarding Water

Employers. Discussion ensued on the subject of minimum amount of inventory allowed under Order U-1. Considerable objection was voiced here, as had previously been heard from other groups (See Editorial, WATER WORKS AND SEWERAGE, Mar., 1943) and it was then voted to send the telegram of protest which has

Snapped at Syracuse

Simon P. Carman
Asst. City Engr.
Binghamton, N. Y.

Wm. H. Clark
Supt. of Water
Avon, N. Y.

F. R. Georgia
Chemist in Charge
Cornell University
Filter Plant

been quoted in the opening paragraphs of this report.

Rapid Tests of Water Quality

In the Friday Morning session, Mr. F. Wellington Gilcreas, Assoc. San. Chem., N. Y. State Dept. of Health, and State Gas Coordinator, presented a paper on "Rapid Tests of Water Quality." "The purpose of rapid tests," said Gilcreas, "is to determine the need for emergency treatment to offset contamination due to floods, fire or war." The following points were covered in the paper; 1) the determination of the adequacy of chlorination and the limitations of the oetho-tolidine test; 2) the technique of the flash test for free chlorine in water; 3) the determination of high concentration of chlorine by use of the drop dilution method; 4) Faber's chlorine demand test described in the Journal of the AWWA, Vol. 34, p. 747 (1942); 5) the ultimacy of the bacterial tests, which are of course subject to delay for final results; 6) the determination of the presence of chemical warfare agents either by pH or by chlorine demand inasmuch as these organic compounds hydrolyze to give acids and are reducing compounds. "Gas officers," concluded Mr. Gilcreas, "should tell one as to the seriousness of the amount of chemical agent present and where to have tests made."

Business Vision and Post-War Problems

In presenting a talk on "Practical Business Vision for the Post War Period" Mr. Carlton K. Matson, Asst. Field Dir., Field Development Division of the Committee for Economic Development, opened with the statement that "We have universally pure water in this country but I hope that we are not deluded into thinking that Public Works is the only means of recovery after this war." The Committee on Economic Development is a private business group which believes that private enterprise must prevent any possibility of a depression or suffer the consequences of a huge public works program and debt which returning soldiers are bound to vote themselves if there is no other work.

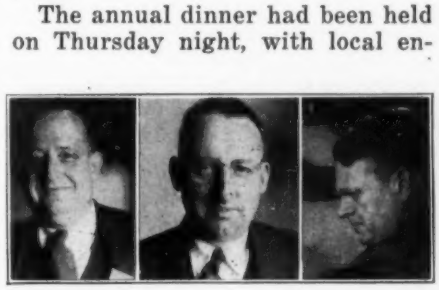
Although this organization is privately financed and operated, it maintains friendly relations with all governmental agencies. "It is our job," said Mr. Matson, "to help encourage companies throughout the country to commence to do their jobs in developing high level employment after the war." It is desired to reach 2,000,000 companies, employing 55,000,000 men and develop a program which is more than pump priming. "These 2,000,000 companies will be soldiers in a war to defeat defeatism and although it has never been done before there is no reason why it cannot be done if we have faith," concluded Mr. Matson.

Brewster on Defense Worker Protection

Major John H. Brewster presented a new phase of "Wartime Water Works Organization and Civilian Defense" when he told about the Medical and Cash Benefits for Injuries to Civilian Defense Workers. Money has been made available "to provide temporary aid to civilian defense workers injured in the performance of their duties. Field training is considered "official duty." Death benefit is provided as is assistance to the families of injured men who are in financial need. To receive such aid a person must be a registered Civilian Defense worker and have a certificate of membership. The regulations differentiate between workers and trainees. Trainees for utility repair squads must have three hours of gas defense training. The administration of the program is through a Personnel Officer of the Civilian Defense Corps who will certify as to the status of the claimant for relief under the War Civilian Security Program and as to whether injury or death was sustained in the performance of official duties. This certification is subject to review by the O.C.D. and the Federal Security Agency."

R. D. Kelly, Engineer of the Fire Insurance Rating Organization in Syracuse, told of "The Major Role of Water Supply in Fire Protection" and this was followed by an excellent paper on "The Cooperation Between Water and Fire Departments" by James J. Higgins, State Fire Administrator, of the State Office Fire Mobilization, Albany. Higgins urged the cooperation of which he spoke and the education of the public to the importance of water systems. Mr. Willert R. Wilson, Asst. to Chief, Engineer Section, Office of Civilian Defense, Second Region, N. Y., substituted for H. E. D'Andrade on the subject of "Blackouts and Dimouts." Dimouts are important to seaboard cities as evidenced by the fact that the silhouette effect of Los Angeles in ordinary times is 250 miles. Mr. Francis Keally, camouflage expert attached to the Second Civilian Defense Region, O.C.D., described modern camouflage methods with particular reference to water works. The use of special paints was discussed as was the use of decoy or dummy intallations. Mr. Keally illustrated his talk with confidential slides recently received from London. The meeting was adjourned shortly after the final paper.

The annual dinner had been held on Thursday night, with local en-



Western New Yorkers

Fred V. H. Piper
Office Mgr., Niagara Falls Bureau of Water

N. L. Nussbaumer
Comm. Pub. Wks.
Buffalo

Carl J. Bernhardt
Dist. Engr., N. Y. State Dept. Health
Jamestown

tertainment provided by the local arrangements committee, headed by Hon. Thomas E. Kennedy, Mayor, and A. A. Korves, Manager of the New York Water Service Corporation.

WHY DIRTY FILTERS?

By HERBERT E. HUDSON, JR.*
CHAMPAIGN, ILL.

The Author

IT HAS been demonstrated pretty clearly that clean filters as a rule produce water of better quality than that produced by so-called "ripened" filters.[1, 2] These findings, however, seem to have snuggled obscurely in the literature—and, *the dirty filter is still with us.*

There has been a growing belief that the standard back-wash rate of 15 gallons per square foot per minute is not sufficient to cleanse the filter bed thoroughly, and there is a definite tendency for the designers of new plants to provide increased filter washing facilities. Some water works men are attempting to revive the air wash. Others use manual wash auxiliaries, such as hosing, raking, tamping, etc. In the last few years, a number of filtration plants have been equipped with a system which is known to keep the sand clean—the surface wash. But too many still content themselves with rebuilding the beds when dirt accumulation becomes too severe.

When Is a Filter Dirty?

The Baylis method of measuring mud balls[3] has proven a most valuable guide for the filtration plant operator in giving a picture of progressive dirt accumulation. This method was used at the Chicago Experimental Filtration Plant for a period of years, and it has provided much valued information on washing methods. Extended experiments[2, 4] have demonstrated the following truths:

1. The standard wash rate (15 gpm. per sq. ft.) does not always keep the filter bed in satisfactory condition.
2. The air wash effects some improvement over the standard wash.
3. High velocity washes are better than the above two, but still do not produce perfect results.
4. The surface wash, supplementing the standard wash, keeps filters in excellent condition.

How Do Filters Get Dirty?

One reason that operators do not concern themselves overly much about the condition of the sand bed has been the division of opinion over the origin of filter bed troubles. There are those who claim that filters get into bad condition because the wash water is unevenly applied beneath the bed—that the poor distribution of wash water along the edges of the beds fails to clean those sections of the bed, therefore mud collects in them. There is another group which claims that troubles start at the top of the filter. They say: (a) the mud is not removed thoroughly from the sand by back-washing, hence mud balls form; (b) these pack into clogged masses; and, being compressible, permit the bed to shrink away from the sidewalls; (c) this leads to further mud accumulation, which (d) causes bad wash water distribution. The writer agrees with the latter group.

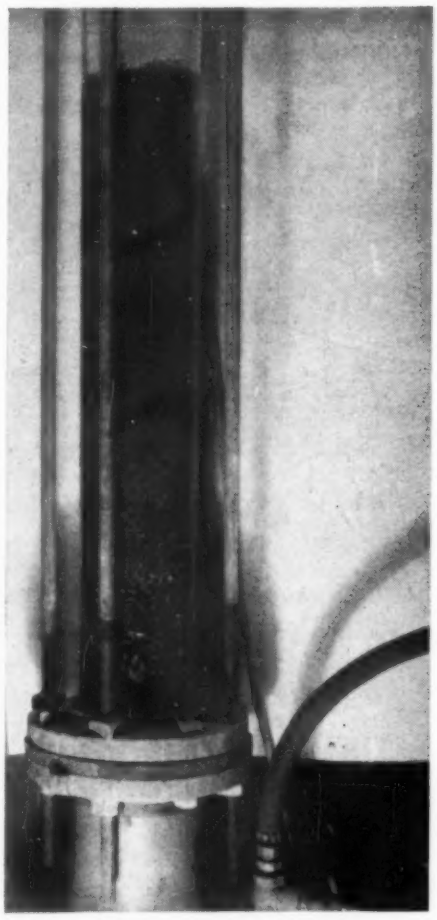


Fig. 1—Clogging Along Side Walls

A photographic record was made of the behavior of a bed of sand in a 6-inch glass tube filter, during washing. This bed had been washed at 50 per cent expansion routinely. No supplementary agitation had been used. Numerous mud balls collected in the bed. An analysis of the sand after its removal by siphoning through a 3/8 inch hose (which broke up many of the mud balls) showed that there was 2.5 per cent mud balls.

Since this test was made on the whole bed of material instead of only the top 6 inches, as is customary, the results are considera-

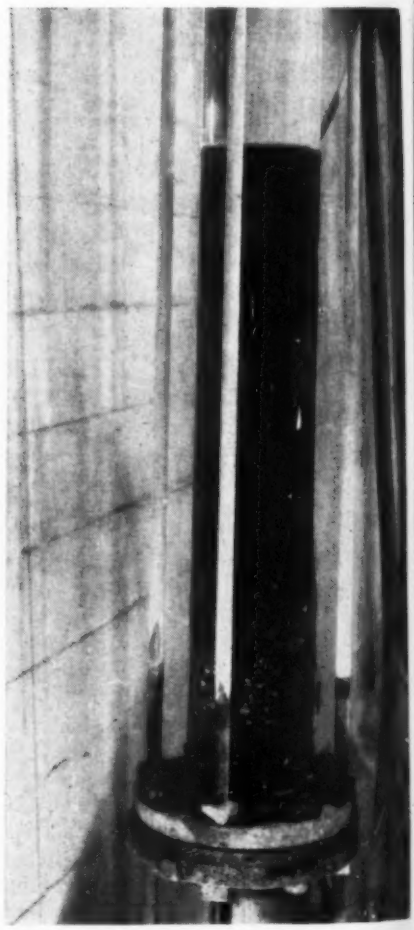


Fig. 2—Agglomerated Masses Resting on Gravel

*Secretary, Illinois Section A.W.W.A. on leave from Chicago Dept. of Public Works fulfilling a war assignment.

bly lower than we would expect from a test on the upper sand. Probably this filter would have had about 10 per cent mud balls in the standard test. Wash distribution in the unit was excellent when first installed, although by the time the accompanying photographs were taken distribution had become quite poor, due to accumulation of a clogged mass which rested on the gravel. It was clearly seen that the progressive formation of this clogged mass resulted from mud balls which formed at the top of the unit and, later, from coagulated material which penetrated sideways into the bed after shrinkage began.

Figure 1 shows the filter in operation, after a filter run which extended for several days during a period when runs on comparable clean filters averaged about 8 hours. Loss of head through the unit was 5 ft. Pulling-away from the sidewall is quite evident. Figure 2 shows the filter during washing, illustrating how an accumulated clogged mass sinks to the bottom and spoils good wash distribution.

How About Underdrain Design?

There are a number of types of filter bottoms which can provide proper wash water distribution if they are given sound hydraulic design. Admittedly, there are poorly designed underdrain systems; but, in designing, care in balancing velocity head against loss of head will permit the use of almost any system. However, even in many plants having well-designed underdrains, the sand is found to be in poor condition. Result: poorly filtered water.

An old adage says: "Watch the pennies, and the dollars will take care of themselves." Similarly some say: If we operate the whole treatment plant well, the filters will stay in good condition. There is truth in this belief. Unquestionably, good preparation of the water for filtration is a definite aid in keeping filters clean. Yet it is known that there are numerous plants having high-class coagulation and sedimentation processes, which have badly fouled filtered beds. In the Chicago Experimental Plant, and in several other plants treating similar water (all having mixing, chemical treatment and settling in accordance with good modern practice) filter beds washed in the usual manner showed themselves to be in "fairly bad" condition. Good pretreatment may reduce filter bed troubles, bit it won't eliminate them.

In addition to a division of opinion on whether back-wash distribution or wash procedure causes filter bed troubles, there has been considerable discussion of the use of materials other than sand as a method of eliminating filter bed troubles. The acceptance of the dogma that a 50 per cent expansion of the filter bed will keep it forever clean has led to either (a) use of high velocity back-wash, or (b) the exploitation of materials which will expand 50 per cent at low wash rates.

What Happens During Backwashing?

In order to understand the results of these recent practices, we ought to examine the back-washing process closely. During filtration, coagulated materials is collected in the granular filtering material. This coagulated material compacts somewhat in the bed, reaching a density of 1.1 to 1.4.[4] During the backwash, it is hoped that the coagulated material is dislodged and crumbled. The crumbled particles have definite densities, therefore definite settling rates of various magnitudes.

The density of the coagulated material strained out in the filter can not be expected to vary with the type of filtering material used. To eject the coagulated material, a certain upward velocity is required. If we choose a filtering material which is but slightly heavier than the coagulated material, it will take the wash water a long time to flush the coagulated material out of the filter.

Any particle of material has a definite falling velocity in water. When a filter bed begins to expand during backwashing, this velocity has been reached for the expanded material. No matter how much the expansion increases above the first observable expansion, the velocity of the water between the *suspended* particles cannot further increase.[5] In consequence, there is no gain in scouring velocity between the particles when expansion is further increased, the only conceivable scouring advantage being in the movement imparted to coarse particles deeper in the bed. In these days of more or less uniform filtering materials, this often is needless. Try it out in a glass tube unit.

The use of 50 per cent expansion provides a rapid velocity above the filtering material, thus aiding in conveying away the crumbled bits of coagulated matter. There's a catch in this: the coagulated matter isn't always broken into particles of a size and shape that can be washed out of the bed. And on the other hand the scouring power of the backwash may be partially spoiled by high expansions in that they spread the sand particles further apart to actually prevent their rubbing together. Therefore, increasing the per cent expansion of the filtering material may reduce filter bed troubles to some degree, but it will not eliminate them.

The Question of Gravity of Filtering Materials

Choice of a filtering material lighter than sand must be made cautiously. The lighter the material the greater the expansion and decreased scouring results, accompanied by decreased transporting upflow velocity. The end result is that mud balls sink deeper into the bed. On the other hand, there may be great merit in the use of materials heavier than sand, for they can provide better scouring, greater actual velocities, and less opportunities for mud ball sinking.[6]

We should remember that one of the properties of light filtering materials gives them superficial superiority. Mud balls sink deeply into expanded beds of light material.[6] Hence the beds may look better than they actually are and mud balls may not appear in a sample taken of the top 6 inches. The mud ball test, since it is made on the upper portion of the filter bed, will give too low results for materials lighter than sand—too high results for materials heavier than sand.

Is there nothing good to be said for light filtering material? Surely. The use of a layer of coarse light material atop the finer sand bed is a proven means for lengthening filter runs. Some of the light materials are completely resistant to the action of caustic waters, thus they are invaluable for certain treatments. They are often usable to good advantage in plants in which the washing facilities are of inadequate capacity, as a means to ensure expansion of the entire filter bed.

There is no reason to feel that the light materials are unsuited for use with modern washing practice. The writer has had occasion to operate filters containing anthracite, in which surface washes were used, and from which excellent results were obtained. The filters were kept clean. Care had to be exercised in adjusting the surface

washes to prevent washing out the coal, but once this adjustment was made no difficulty was encountered. It is not intended to argue against the intelligent use of light filtering materials. They can be used in installations which provide thorough cleansing. They should not be used indiscriminately, nor solely to increase the filter bed expansion.

Summary

The prime source of filter bed troubles is inefficient media scouring, a weakness inherent in the unaided backwash. While good pretreatment should lessen filter bed problems, it won't eliminate them. Increasing sand expansion reduces filter bed troubles, but does not do away with them sufficiently. The use of material lighter than sand, simply to obtain increased expansion, is not altogether praiseworthy.

Cleaning a filter after it has become fouled is like locking the barn door after the horse has run away. What is needed is a scouring force to supplement the backwash, a force strong enough to smash the bits of coagulated material collected by the filter. Tamping, hosing, and strong chemical treatment will do the trick, but these cures prove laborious and bothersome. The surface wash is preventive treatment, a way of keeping the sand entirely and continuously clean, cheaply, simply, and positively.

References

(1) Hulbert, R. and Herring, F. W. Studies on the Washing of Rapid Sand Filters. Jour. A.W.W.A. 21:11, Nov., 1929, p. 1445.

(2) Hudson, H. E. Filter Washing Experiments at the Chicago Experimental Filtration Plant. Journ. A.W.W.A. 27:11, Nov., 1935, p. 1547.

(3) Baylis, J. R. Experience in Filtration. Jour. A.W.W.A. 29:7, July, 1937, p. 1010.

(4) Baylis, J. R. Washing Rapid Sand Filters. Water Works and Sewerage 82:1, Jan., 1935, p. 20.

(5) Herring, F. W. Discussion of (1). Jour. A.W.W.A. 21:11, Nov., 1929, p. 1487.

(6) Baylis, J. R. Mud Ball Formation and Measurement. Water Works and Sewerage, 82:9, Sept., 1935, p. 326.

WATER AND SEWAGE PATENTS

By JULIAN F. SMITH
A Digest
Associate Director
HOOKER SCIENTIFIC LIBRARY
CENTRAL COLLEGE
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Water Patents

WATER FILTER. Jas. E. Michaud. U. S. 2,302,240, Nov. 17. A filter which purifies water by passage through a layer of charcoal separated by a screen from a porous stone filter through which the water makes its final passage.

PROCESS WATER. W. M. Bruner (to E. I. du Pont de Nemours and Co.). U. S. 2,302,598, Nov. 17. Adding a hydroxynitrilosulphonate to water to improve its efficacy in flocculation, deflocculation, frothing, deterging, dyeing and wetting operations.

FEEDWATER CONTROL. Chas. B. Arnold. U. S. 2,302,931, Nov. 25. Controlling the supply of water to a boiler by setting up a differential pressure proportional to the water head in the boiler, and actuating the control according to this differential.

WATER SUPPLY SYSTEM. Chauncey P. Fuller. U. S. 2,303,627, Dec. 1. The pump of a water supply system has input and output chambers for maintaining absolute suction pressure to the required extent.

WATER SOFTENER. C. T. McGill (to Elgin Softener Corp.). U. S. 2,304,109, Dec. 8. A tank for softening water has a freeboard space at the top and is fitted both at top and bottom for collection and distribution of water to the bed of softener.

SOFTENING WATER. A. Gudmundsen (to Gudmundsen-Stratton Laboratories, Inc.). U. S. 2,304,453-4, Dec. 8. A water softener having a removable zeolite cartridge in which the zeolite is held under compression; and an automatic laundry machine having a water softener attached in such a way that filling of the machine with softened water is automatic.

WATER SOFTENER CAKES. Andrew J. Chesson. U. S. 2,304,626, Dec. 8. Forming cakes of water softening reagent in layers, each layer having a cavity to receive additional water treating material, the cavities being interconnected by perforations.

BOILER WATER. W. L. Denman (to Dearborn Chemical Co.). U. S. 2,304,805, Dec. 15. Adding not more than 0.05% of dodecylamine to industrial waters such as boiler feed water.

IRON IN WATER. O. Rice (to Hall Laboratories, Inc.). U. S. 2,-304,850, Dec. 15. Preventing precipitation of iron in well water by adding a dehydrated alkali metal phosphate before the water is exposed to air.

PURIFYING WATER. Marion H. Rowe (one-half to Jos. H. Reynolds). U. S. 2,305,108, Dec. 15. A photoelectric device for controlling the feed of chlorine in a water purifier by the color difference between raw and chlorinated water, the latter being colored by a reagent.

REPAIR TOOL. Benj. F. Curtis. U. S. 2,305,143, Dec. 15. A repair vise for use in repairing water meters.

Sewage Patents

TREATING POLLUTED WASTES. R. W. Stenzel (to Petrolite Corp., Ltd.). U. S. 2,303,588, Dec. 1. Preventing surface-layer contamination of a body of water into which a polluted effluent is discharged, and subdividing the effluent to aid diffusion by natural currents, by intimately mixing the effluent water with the polluting material so that agglomeration after discharge is avoided.

SETTLING TANK. H. F. Entwistle and H. L. Husson (to Western Electric Co.). U. S. 2,304,248, Dec. 8. A settling tank contains a weir and a horizontal pipe with its axis at the level of the weir top, the pipe having small outlets along its bottom and a large outlet along its top.

AERATING SEWAGE. A. F. Nielsen (to Guggenheim Bros.). U.S. 2,304,274, Dec. 8. Aerating sewage while flowing through a suitable apparatus, and adding biochemically active sewage sludge at several points along the path of flow.

SEWAGE CUTTER. Nicholas Santucci. U. S. 2,305,109, Dec. 15. A cutter for sewage has a slotted cylinder with fixed blades recessed in its periphery and movable blades outside to engage with the fixed blades.

SCUM REMOVER. N. B. Lund and J. H. Knowles (to Dorr Co., Inc.). U. S. 2,305,929, Dec. 22. Apparatus for taking off scum from liquid in a settling tank has a skimmer blade carried by a float and operated by a movable carriage.

SEWER FLUSHER. Howard W. Jewell. U. S. 2,306,445, Dec. 29. An automatic system for high velocity sewer flushing has a siphon and a single-turn coil which imparts swirling motion to water discharged into the sewer.

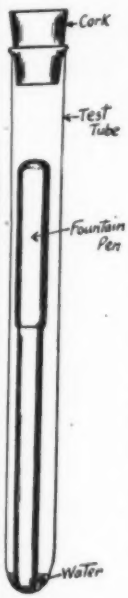
Rocky Mountain Water and Sewage Short Schools

The upper picture was made during the 1943 Rocky Mtn. Short School for Water Operators, Feby. 8-10, in Denver, Colo. The lower picture is of those attending the 1943 Rocky Mtn. Short School for Sewage Plant Operators held Feby. 11th and 12th in Denver. Each school was attended by approximately 45 operators.

To Dana E. Kepner, Secy.-Treas. of the Rocky Mtn. Sewage Works Ass'n, we are indebted for the pictures.

How to Use India Ink in an Ordinary Fountain Pen

Many users of India ink believe that such ink cannot be used successfully in an ordinary fountain pen. That belief, however, is incorrect as this writer has been wielding a pen of that type with India ink in it for a number of years and has not yet had any serious trouble.



The principal thing to watch out for is—keep the ink flowing and don't allow it to dry up. In other words, keep the ink moist. When the writer first began using a fountain pen in this way, he plugged the holes in the cap with wooden plugs and always fitted the cap down tight on the barrel of the pen. By keeping the holes plugged, no difficulty was experienced, but it was rather inconvenient to keep the pen in a handy place due to the danger of knocking the plugs out. He, therefore, devised the better method shown in the accompanying sketch, and that is: when not using the pen, keep it in a corked test tube, as indicated. The tube should contain a little water, as shown, so that the air within the tube will always be moist.

Caution: Don't change from regular writing fluid to India ink without first giving the pen a thorough washing. The two varieties of ink do not mix well. When mixed they seem to form a solid or precipitate which clogs the pen, making it necessary to give the pen a thorough cleaning anyway.

(Contributed by W. F. Schaphorst, M.E., Newark, N. J.)

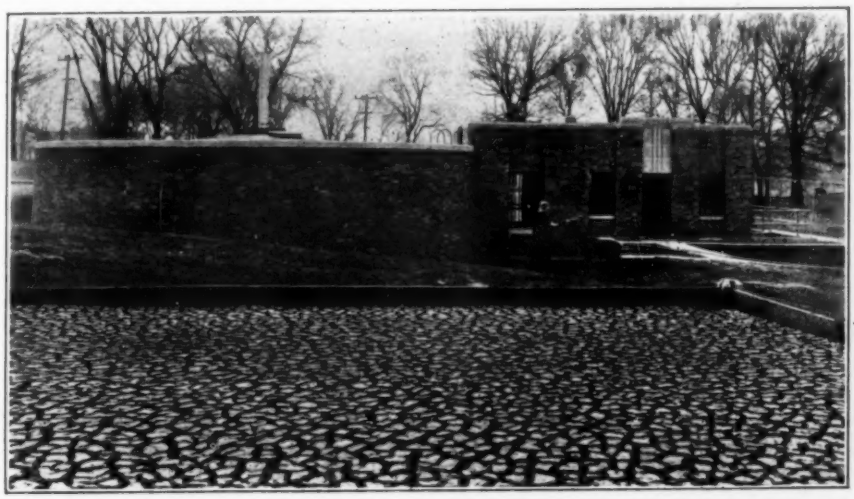
Feeding Time in Morrison's Municipal Zoo

Morrison, Illinois, has a unique combination of modern sewage disposal plant and municipal zoo, but the latter feature was an afterthought.

When three Morrison youths captured a husky young buck after a barehanded struggle some time ago, they looked about for a place to keep their captive. The sewage plant with its high wire fence appealed as a likely spot.

Today the buck, according to Supt. Harry Traum, Jr., is as friendly as a puppy. He follows plant employees and visitors about, shows an active interest in what they are doing, and consents to pose before the camera if bribed with apples or sugar.

The plant's power house and P.F.T. floating cover digester serves as a background for this striking picture of the buck being fed by a visitor.



The Editor's Comments

Charlie Thomas—"Ambassador of Commerce"

IN THE passing of Charlie Thomas, of Roberts Filter Co., the water supply industry has lost one of those exceptional individuals who attained success and high reputation as a "peddler" of water works equipment and grew to reach a standing in the field which deserves the title—"Ambassador of Commerce."

We do not know who coined this title but we have known several salesmen and sales managers which it especially seems to fit. One of these was Charles F. Thomas, General Manager and Vice-President of the Roberts Filter Manufacturing Co., of Darby, Pa., whose untimely death on April 1st, resulting from a heart attack, is recorded on another page of this issue.

Charlie Thomas started at the bottom with the venerable Roberts Filter Co. in 1910 as a shop helper. His character and ability were early recognized by the founder of the company which bears his name. He left to fight in France with the A. E. F., and upon his return he was placed in the Sales Department and given Southern territory. This is when we first came to know Charlie Thomas.

It was clear, even on short acquaintance, that he appreciated the fact that the firm he represented had "the goods" backed by sound engineering, honest bidding and a splendid reputation. Charlie Thomas' one idea in selling was that this should always be the case. If he ever told anything in the way of an untruth about his own or his competitors' equipment and/or service, we have never heard of it. It was this type of honesty and square shooting that gained for Charlie Thomas the confidence and high regard of designing engineers. His standing with state sanitary engineers came also to be of the highest sort and he found himself at times in the position of acting as advisor on some feature of filter design in which there might be a question of difference of opinion between the designer and the approving authority.

Charlie Thomas had an outstanding characteristic which was obliged to make for success and high standing as a salesman and contractor on filter plants. There was no "just as good" ever in his mind. He was, first and last, intent on having the best job possible—one which would do full credit to the designer; one of which the owner could be proud; yes, one to which Charlie Thomas himself could point with pride and could always go back to in years to come and find a still satisfied customer and another booster for the "House of Roberts."

Yes, this was the philosophy and policy of Charlie Thomas—"Ambassador of Commerce"—who rose from tool-boy to become the active head of his company, the name plate of which has come to stand for much on the many plants that Charlie Thomas has put it on.

Key Men—Today and Tomorrow?

We have said on numerous occasions, and say again, that it is the general opinion of most of us who went through World War I that no good cause is served if key men and operating heads of water and sewer systems and public health services leave their jobs to enter the country's armed services. We have urged managers of water and sewer systems to look upon the service that they are rendering as a home front service of high importance; and, for the good of America, to stick to their jobs and take early steps to file form 42A with local draft boards for deferment of all indispensable key men on their staffs.

We find that those managers and key employes who are over the draft age are not as a general rule difficult to convince that they are performing a first-line home-front service by remaining on the job, rather than seeking a commission in some branch of the armed services which may afford them the satisfaction of walking up "Main Street" in a uniform and possibly getting them a chance to see something of the world.

On the other hand, those younger managers and key men within the draft age, either out of protection to themselves against being drafted or of being considered "slackers," are leaving their responsible water supply jobs for direct defense jobs or entering the uniformed services. In some sections of the country these losses of key men from water supply and sewerage is becoming of real moment and concern.

It seems that in the smaller cities the attitude of local draft boards is to a large measure responsible. Knowing this attitude, which is to the effect that some older local resident can take over the water supply operation, these younger managers and key employes do not feel that they can take the risk of being inducted in the end; or, else, of being branded locally as slackers. In consequence they have gone into better protected defense industry work or have secured cantonment utility jobs, or a commission in some branch of the services.

These younger men look also at this problem of serving on the home front from the standpoint of their future status in municipal employment and where they will stand in civil service ratings following the war. In fact, it is these last two considerations which are causing large numbers of key operating men to consider it best to get into a uniform. They argue that ex-service men of World War I enjoyed decided advantages in civil service ratings and competitive examinations after the war over those who had no service record to their credit.

It is true enough; these younger men have a lot to think about in the two considerations mentioned and something should be done in the direction of officially classifying and recording key water and sewage works operators as essential home front "fighters." It strikes us that this is a problem for immediate handling by the War Manpower Commission. It is not a difficult problem to our thinking. All home front workers in essential occupations can be "commissioned." In certificate form this "commission" should take rank with commissions in the uniformed services when it comes to the post-war status of the holder. The question of community standing during or after the war can readily be taken care of by a distinctive lapel emblem to be worn by those individuals who are considered essential "home-front soldiers" and are entered in official Federal records as such when receiving the certificate of "civilian commission" suggested. To our thinking this would solve many problems which we older men must fully recognize as of genuine and understandable concern to the younger key men in our utility and public health services.

L. H. Enslow

MEETINGS SCHEDULED:

Apr. 19-20—LITTLE ROCK, ARK. (Marion Hotel).
Arkansas Water and Sewage Conference. (Annual Conference). Secretary, Harrison Hale, 114 Chemistry Bldg., Fayetteville, Ark.

Apr. 20-22—ANN ARBOR, MICH. (University of Michigan).
Michigan Section, A.W.W.A. Secretary, M. N. Gerardy, Department Water Supply, Water Board Bldg., Detroit, Mich.

Apr. 29-30—INDIANAPOLIS, IND. (Hotel Antlers).
Indiana Section, A.W.W.A. Secretary, Herman Horstman, 405 Traction Terminal, Indianapolis, Ind.

May 5-7—EAST LANSING, MICH. (State College).
Conference of Michigan Sewage Works Association. Secretary, R. J. Smith, Assistant Engineer, Michigan State Dept. of Health, Lansing, Mich. (The Annual Sewage Works School will be held May 3-4-5.)

May 7-8—BELLINGHAM, WASH. (Hotel Leopold).
Pacific Northwest Section, A.W.W.A. Secretary, Fred Merryfield, Engineering Laboratories, Oregon State College, Corvallis, Ore.

May 13-14—BALTIMORE, MD. (Lord Baltimore Hotel).
Maryland-Delaware Water and Sewerage Association. (Wartime Conference). Secretary, J. H. Schilpp, 2411 N. Charles St., Baltimore, Md.

May 14-15—BILLINGS, MONT. (Northern Hotel).
Montana Section, A.W.W.A. Secretary, H. B. Foote, Director, Div. of Water & Sewage, State Board of Health, Helena, Mont.

May 26—NEW HAVEN, CONN. (Hotel Garde).
New England Sewage Works Association. (Annual Spring Meeting). Sec'y-Treas., LeRoy W. VanKleeck, State Dep't. of Health, State Office Bldg., Hartford, Conn.

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GUARDS HEALTH AT WAR AND AT HOME

The chlorine you use to war on water-borne disease helps produce medicinals needed on fighting fronts.

Even today, with war needs calling for ever-increasing output, HOOKER quality is maintained as rigidly as in the days of Peace. Now and after the "unconditional surrender" of our foes, you can rely on HOOKER quality. It's none too early to think of tomorrow.

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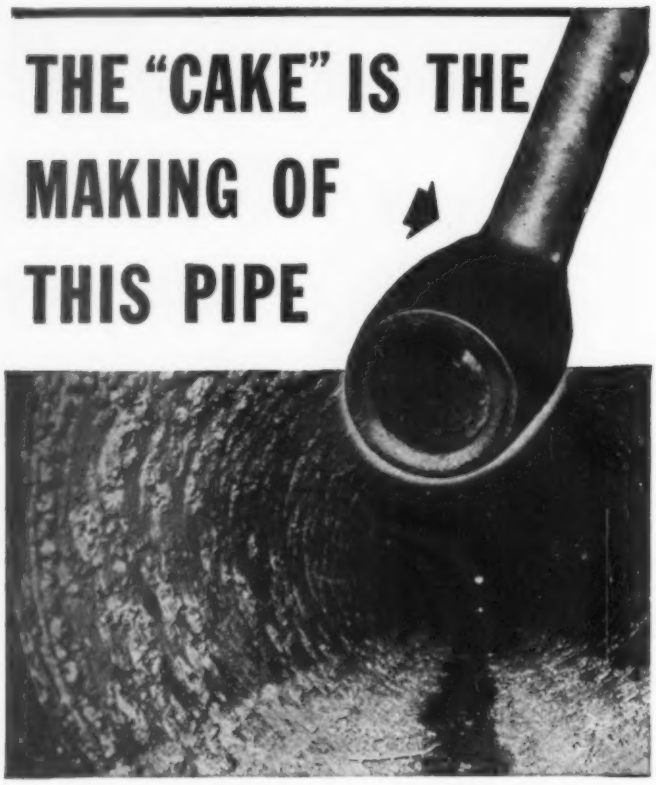
3679

THE "CAKE" IS THE MAKING OF THIS PIPE



....the ruin of this one

Caking, or tuberculation, of water mains should be carefully guarded against. Unchecked, this internal disease, will choke and cripple hydraulic efficiency. If tuberculation has invaded your water system line —*it's time to Centriline.* A protective inner lining of thin, dense cement, applied speedily and economically the Centriline way, will restore and maintain the original carrying capacity of your pipe lines. Providing a permanently smooth, non-tuberculating, non-corrosive surface, this sleek new lining shields the underlying metal—whether steel or cast iron—and insures a high coefficient for life. Eliminate future depreciation costs and pumping expenditures. Recondition now and safeguard your initial investment. Wherever your pipe line is situated, whatever its length—if its diameter is 30" or more—our men can quickly reach and recondition it. We welcome your inquiry.

CENTRILINE CORPORATION

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The Centriline process is a rapid and economical method of reconditioning pipe lines. It consists of first cleaning the main and then applying, by centrifugal force, a dense cement mortar lining of required thickness, mechanically troweled to a smooth finish.

Restores and Protects Pipe-Line Carrying Capacity

June 4-5—ROCHESTER, N. Y. (Seneca Hotel).
New York State Sewage Works Association. Secretary, A. S. Bedell, State Dep't of Health, Albany, N. Y.

June 8—HARRISBURG, PA. (Hotel Penn-Harris).
Pennsylvania Water Works Operators' Association (Annual Meeting). Sec'y-Treas., I. M. Glace, 22 S. 22nd St., Harrisburg, Pa.

June 9—HARRISBURG, PA. (Hotel Penn-Harris).
Pennsylvania Sewage Works Association (Annual Meeting). Secretary, Bernard S. Bush, State Dept. Health, Harrisburg, Pa.

June 15-18—CLEVELAND, O. (Statler & Carter Hotels).
1943 A.W.W.A. (Wartime Water Works Conference). Executive Secretary, Harry E. Jordan, 500 Fifth Ave., New York, N. Y.

June 23—MANSFIELD, OHIO (Mansfield-Leland Hotel).
Ohio Conference on Sewage Treatment. Secretary, J. R. Turner, % Sewage Treatment Plant, Mansfield, O.

Sept. 16-17—DENVER, COLO. (Hotel to be selected).
Rocky Mountain Section, A.W.W.A. Secretary, O. J. Ripple, Supt. Filtration, Littleton, Colo.

Oct. 11-13—OKLAHOMA CITY, OKLA. (Hotel Biltmore).
Southwest Section, A.W.W.A. Secretary, Geo. J. Rohan, Supt., Water Works Municipal Bldg., Waco, Texas.

Oct. 21-23—CHICAGO, ILL. (Hotel to be selected).
Federation of Sewage Works Association. Annual Meeting, "War Time Conference." Secretary, H. W. Wisely, Urbana-Champaign Sanitary District, Urbana, Ill.

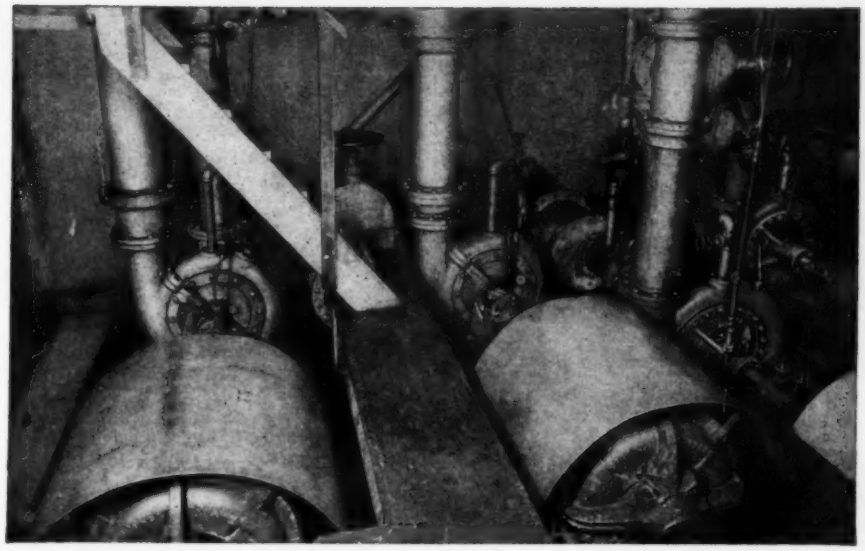
Oct. 27-29—LOS ANGELES, CALIF. (Biltmore Hotel).
California Section, A.W.W.A. Secretary, H. Arthur Price, Box 3669, Terminal Annex, Los Angeles, Calif.

LITERATURE AND CATALOGS

Orangeburg Fibre Pipe, the lightweight, non-metallic, durable, noncorrosive and economical pipe for non-pressure uses, is described in a recent bulletin of the Fibre Conduit Co., long time producers of fiber electrical conduit. With the suggestion that one should specify Orangeburg Fibre Pipe for wastes that are corrosive, for house connections to sewers and septic tanks, for septic disposal systems, for irrigation and subsoil drainage, the bulletin proceeds to present a discussion of the properties of the pipe which make such a suggestion feasible.

The fibre pipe is formed on special machines to develop a homogeneous structure (not laminated) of the cellulose fibre. The pipe is dried, subjected to a high vacuum and thoroughly impregnated with a special coal tar pitch, and it is this vacuum impregnation which is the real secret of the resistance to corrosion, erosion and disintegration. When completed, 25 per cent of the weight is fibre and the other 75 per cent pitch. Characteristics which are advantageous are the resistance to dilute acids, alkalies, and salts of industrial wastes or cinder fills; lack of tuberculation; good hydraulic properties with low friction losses; ease of connection by means of tapered sleeve couplings; ease of installation due to light weight (only 16 per cent that of steel); ease of cutting by ordinary handsaw.

Orangeburg pipe laid underground does not crack due to traffic shocks. Uneven settlement may cause joint deflection but does not rupture the pipe. The coal tar pitch repels root growth. Because joined with tapered sleeve couplings, there is no change in the internal pipe size at the joint and no friction point. A field tooling lathe makes it possible to tool the tapered joint on any section that has been cut. For ordinary usage, jointing compound is not necessary, but asphaltic or pitch compounds may be used. Socket joints are available if desired for downspout use and joints can be made to other types of pipe such as threaded steel or hub joints. Diagrams and tables in the bulletin show the construction of the joint and the use of the 5° angle coupling to allow offsets or produce long curves. Bends and elbows are also available. Instructions for laying the pipe are included in the Bulletin. When perforated, the pipe makes excellent distribution sys-

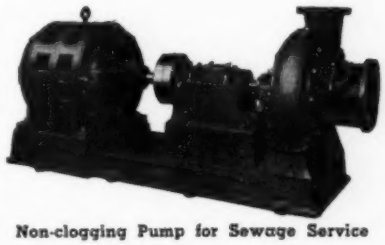


PUMPS...

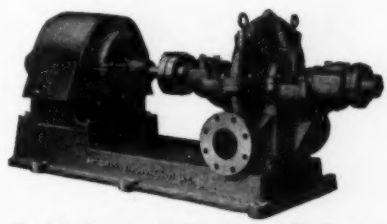
that are not merely "adapted to" but DESIGNED FOR... YOUR requirements

MORRIS has twelve different types of centrifugal pumps for handling abrasive materials such as slurry, sand, gravel, etc. . . . five different types for handling pulpy materials such as sewage, paper stock, etc. . . . and a standard type for every clear water service.

Therefore, whatever your pumping requirements may be, you can be sure of an *exactly suitable* Morris design . . . not merely an "adapted" design. Your benefits are higher efficiency . . . longer service . . . lower maintenance expense. Write for bulletin on the Morris design for your needs.



Non-clogging Pump for Sewage Service



Double Suction Horizontally Split Pump for Water

MORRIS MACHINE WORKS

MORRIS ESTABLISHED 1864

BALDWINSVILLE NEW YORK

CENTRIFUGAL PUMPS

Where Grass Was *Really* Hard To Grow

In many Southern localities, it is very difficult to grow a good stand of grass, as our military authorities have learned in the course of their efforts to make our camps and air fields as attractive and dust-free as possible. This has been especially true of the flying fields, where the wash from the airplane propellers literally blows the top soil away. In most cases, the cost of procuring black dirt or humus is prohibitive.

This problem has been solved at more than one military establishment by using the sludge from the camp or local sewage disposal plant as a top soil, after the sludge had been properly conditioned by a Royer Sewage Sludge Disintegrator. In one reported instance where this sludge was spread in a thick layer over the surface, a surprisingly good stand of grass was grown in a matter of days, when it normally took months to grow grass in that locality. This fast growth was made possible by the Royer. Caked sludge, as it comes from the drying beds, could not have been effectively used.

The Royer is an inexpensive machine, which thoroughly shreds, mixes, aerates and further dries the sewage sludge cake, removing trash and turning it out in a granular form which makes an excellent top dressing or fertilizer. Enrichening or soil sweetening chemicals can be readily mixed in by the Royer in any ratio desired. Too, this fertilizer has a ready market in most regions, or it can be used in the city parks, saving municipalities the cost of buying fertilizer.

Belt-to-tractor Royer — one of thirteen stationary and portable gasoline engine, electric and pulley driven models.

THE ROYER

ROYER FOUNDRY & MACHINE CO.
170 PRINGLE ST., KINGSTON, PA.

tems for subsurface disposal of septic tank effluents. These 16 pages of informative material may be obtained by writing the Fibre Conduit Co., Orangeburg, N. Y., or 292 Madison Ave., New York City.

The M-Scope is the title of a pamphlet of the Fisher Research Laboratory of Palo Alto, Cal. In the pages of this pamphlet is the story of the M-Scope—the locator of buried pipe or wiring; its uses and its field; how it locates the exact position of buried pipe lines, pipe bends, valves, covered manholes, stubs or services; how it traces the exact course of an underground line without contact with the line itself; how it determines the difference between a buried pipe and a single metal object; how it works positively and instantaneously in any kind of ground and any kind of weather; how it eliminates exploratory excavations, prevents accidental damage to other lines, solves problems of lost, unknown or illegal main connections, and saves time, labor and money. The operation of the M-Scope depends on two specially designed radio units, a transmitter and a receiver. It is three pipe finders in one (conductive, inductive, and radio balance operation). The pamphlet contains excerpts from letters of many satisfied users who appear glad to say something in favor of the M-Scope. Also described in this folder is the M-Scope Leak Detector, the use of which will avoid a great deal of time in leak finding and water loss. The instrument will locate the smallest leak in a pipe under pressure. A 4½ inch visual dial and headphones contribute to the accuracy of the detector. It truly has "divining rod" qualities with its pick-up unit consisting of a special crystal microphone, a sounding plate, two sounding rods, and extension cables. The equipment is housed in an attractive leatherette carrying case and has been proved efficacious by many users, one of the largest of which is the Philadelphia Suburban Water Co. More can be learned of the M-Scope Pipe Locator or the Leak Detector by writing the Fisher Research Laboratory, 1961-65 University Ave., Palo Alto, Cal.

Centrifugal Blowers and Exhausters are shown and described in Bulletin 120-B-12, just issued by the Roots Connersville Blower Corp., Connersville, Ind. In addi-

tion to listing applications, the twenty page bulletin presents a discussion of the advantages inherent in the centrifugal design. Two pages are given over to the discussion of operating characteristics with curves, six pages are devoted to sectional views, types of impellers, and installation and shop cuts of the various single stage units, while six pages are also allotted to the multi-stage line. In addition various control devices are discussed, and action views show various manufacturing and testing operations. Building air and gas handling equipment since 1854, and pioneering in positive rotary blowers have provided background of great usefulness in developing the centrifugal designs. Copies of Bulletin 120-B-12 may be had by addressing Roots-Connersville Blower Corp., Connersville, Ind., or the nearest branch office.

Short-Cuts to Faster Piping Jobs is "Piping Pointers" Bulletin No. 6 issued by the Crane Co. to help America's industrial piping men do their share toward winning the war. Helps in meeting piping material shortages, examples of wartime piping ingenuity, and how to get piping jobs done in face of material shortages, are the headings of three pages of excellent and helpful ideas. Typical of the piping ingenuity is the use of an angle valve, where otherwise an elbow and a globe valve located at a turn in a line would be required; making flanges from steel plate; the elimination of a 10 x 4 reducer by using a 10 x 6 reducer and a 6 x 4 reducing companion flange. For design purposes it is suggested that flexibility in specifications with allowable alternates should be clearly indicated. For this interesting and helpful series of "Piping Pointers" write to Crane Co., 836 Michigan Ave., Chicago, Ill., or any Crane representative.

Filter Cloths in all weights and construction, woven from cotton wool, glass and Duraklad are described by the William W. Stanley Co., Inc., of New York, in an informative four page folder. Representative samples of these Stanley Filter Cloths are attached to the folder and described. These include cotton twill, Acitex, and Alkatex twill (finishes applied to cotton twill to make them resistant to acids and alkalies), woven glass, Duraklad (vinyl plastic) and coarse weave cable press cloth. The cotton

Prepare for Emergency with

M H

VALVES
HYDRANTS
AND
WATER WORKS
ACCESSORIES

Emergency fire-fighting facilities often may be improved by installing more valves and hydrants than normal, also keeping larger stocks of extras for emergency. M & H Products are well known for high quality and expert workmanship, have been widely used for many years in water works and sewer systems.

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Fire Hydrants
Gate Valves
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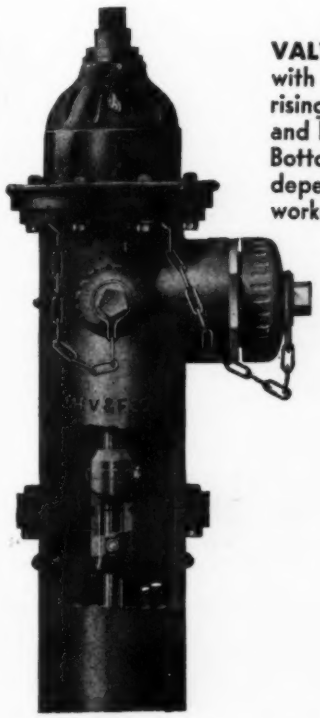
Sludge Shoes
Flange and Flare Fittings
Flanged Fittings
B & B Fittings
Cutting-in Tees



VALVES: A.W.W.A. type, iron body, bronze mounted with double-disc parallel seat or solid wedge type. Non-rising stem, outside screw and yoke, or with sliding stem and lever. Also furnished hydraulically operated. Square Bottom type operates in any position. All rugged and dependable, made of best material with highest quality workmanship.

HYDRANTS: Standard A.W.W.A. type approved by Underwriters and Factory Mutuals. Dry top, revolving head, easy to lubricate. High efficiency because barrel diameter not reduced and there are no working parts or obstructions in waterway. SPECIAL TRAFFIC MODEL (shown at left) is designed to yield at ground line under impact, repair being simply renewal of breakable bolts and breakable coupling on stem.

M&H VALVE
AND FITTINGS COMPANY
ANNISTON, ALABAMA

SMITH
TAPPING SLEEVES

THE A.P. SMITH MFG. CO. EAST ORANGE, N.J.

Symbol of Quality Since 1889

MAKING PRESSURE CONNECTIONS
Without Stopping the Service

SMITH Tapping Sleeves for making pressure connections to A.W.W.A. standard mains, classes A, B and C, and for pressures up to 150 lbs. per square inch, are made in four types, here illustrated. At top: 1. Clamped Sleeve Joint; 2. Bolted Sleeve Joint. Bottom row: 3. Bolted Sleeve Joint with flanged end joint valve connection; 4. Hackensack Sleeve Joint with flanged end joint valve connection.

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Valves and Hydrants — Valve Inserting Machines — Tapping Sleeves — Tapping Valves — Hat Flanges and Water Meters
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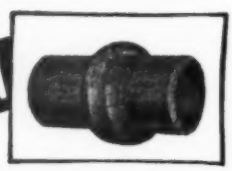
SAVE *with* TENNESSEE CORPORATION Ferri-Floc FERRIC SULPHATE

Write today for actual case histories of plants now using the ideal ferric coagulant.

TENNESSEE CORPORATION
Atlanta, Georgia Lockland, Ohio

WESTON



GASKET AND FORM
The Perfected Method for Making
SEWER PIPE JOINTS OF CEMENT

- No jute used—gasket centers spigot.
- Definite space in each joint for cement.
- Form confines cement-grout to lower portion of joint.
- Particularly advantageous in water-bearing trenches.
- Infiltration minimized.

L. A. WESTON Adams, Mass.

and wool filter cloths are made in over 120 weaves and weights ranging from 8 oz. to 50 oz. per sq. yd. Woven glass cloths are made for rotary, gravity, and other types of filters. These are corrosion resistant. The vinyl plastic filament cloth, known as Duraklad, is resistant to acids, alkalies, salt solutions and is water repellant, mildew and rot proof, but its temperature range is limited to 131 deg. F. Operators with filter cloth problems may find the solution by writing to William W. Stanley Co., Inc., 401 Broadway, New York, N. Y., for further information.

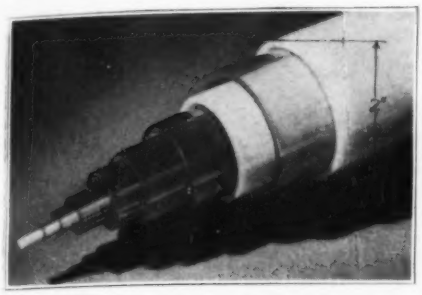
De Laval Worm Gears, Leaflet E-1219, of the De Laval Steam Turbine Co. describes bottom and top drive worm gears for 3 and 3½ inch center distance. The casings are cast in one piece and all moving parts are enclosed so that safety guards are unnecessary. Quiet and with high efficiencies that improve with use, these gears are supplied with ratios from 3⅝ to 1 up to 60 to 1. Worm and shaft are made of nickel steel, gear from special gear bronze, case of semi-steel. Tables of horsepower ratings are included in the leaflet, as are tables of standard dimensions, referenced to drawings. These gears are suitable for operation of low-powered machinery, such as mixers, dryers and small conveyors, and have the added advantage that the lower ratios can be used as speed increasing gears where the maximum worm speed does not exceed 1,750 r.p.m. Additional information in Leaflet E-1219 may be obtained from the De Laval Steam Turbine Co., Trenton, N. J.

Ruggles-Coles Dryers are pictured, diagrammed and discussed in Bulletin No. 16-C of the Hardinge Co. of York, Pa. The fundamentals of drying and the classification of materials with regard to temperature ranges and conditions are briefly outlined and discussed. One section is devoted to construction of the dryers, including the shells, bases, gearing, fans, furnace and feeding arrangements. Nine different types of dryers are described more or less in detail as to construction and operation. Kilns, coolers, cyclone dust collectors, and disc feeders are also described in Bulletin No. 16-C, which may be obtained from the Hardinge Company, Inc., York, Pa.

EQUIPMENT NEWS

"Tulox" Plastic Tubing Now Produced in All Sizes Up to 2 Inch

Extruded Plastics, Inc., of Norwalk, Conn., announce that, "TULOX" seamless plastic tubing is now

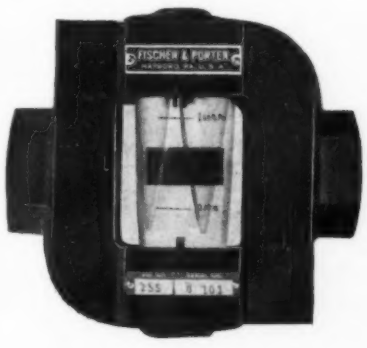


available in all standard pipe and tubing diameters up to 2" O.D. Within the next few weeks the range will be increased to 2½" O.D., to meet requirements of war industry, housing projects, etc.

Extruded from Tennessee Eastman cellulose acetate butyrate, "TULOX" tubing is available from warehouse stocks throughout the country through the Crane Co. of Chicago and Julius Blum & Co., of New York.

New Sight Flow Indicator Using Rotameter Principle

Fischer Company, makers of the Rota-Meter, announces the "Rota-Sight" for flow indication in any application where an approximation of the amount of flow rate is an operating aid or necessity. This simply constructed flow indicator clearly shows when a liquid or gas is passing through a line and has an indicating float which moves up and down in a pyrex tube in direct proportion to the amount of flow. The "Rota-Sight" is particularly sensitive to low flows and informs the operator the very second the flow starts. The float is readily visible even through opaque fluids. Scale markings may be engraved on the tube for checking one flow rate, or for holding the flow between a predetermined high and low rate. If preferred, an arbitrary reference scale may be provided. The "Rota-Sight" may be equipped with an alarm which is a positive and inexpensive device for visible or audible protection against dangerously low or high flows. High and low alarm positions are adjustable over the entire flow range of the instrument. An interesting leaflet, Bulletin 101, explaining the "Rota-Sight" in detail and giving dimensions, flow rates, and maximum operating pressures will be sent, without obligation, by the Fischer & Porter Co., 954 County Line Road, Hatboro, Pa.



Weld Cleaning Tool

A new and improved weld cleaning tool for a variety of welding work is now being manufactured under the trade name Dual-Tool by the Atlas Welding Accessories Co.

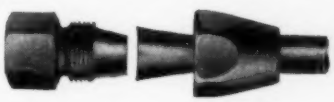
The Dual-Tool combines a wire bristle brush and a slap-removing bit in one unit and features a specially-developed brush holder which per-

ASARCO Type K Tube-Loy and SUPERSEAL Flared Fittings for Main to Meter Water Service

Have you been stymied getting materials for Main to Meter Water Service?

Here's your answer . . . ASARCO Type K Tube-Loy and SUPERSEAL Flared Tube-Loy Fittings. This combination, made of less critical materials, offers the advantages of easy handling for fast installation, long life, leak-proof connections and trouble-free service PLUS *availability right now.*

For complete information and descriptive catalog on SUPERSEAL Flared Tube-Loy Fittings and ASARCO Type K Tube-Loy, call your nearby GRINNELL BRANCH or write Grinnell Company, Inc., Executive Offices, Providence, R. I.



SUPERSEAL Flared Tube-Loy FITTINGS

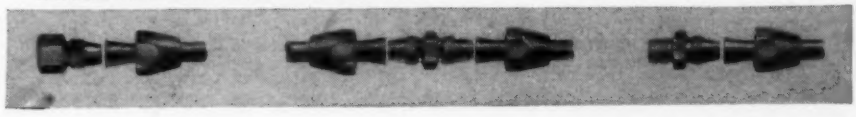
★ Made of malleable iron, electro galvanized.
★ Long, 10° tapered cone provides greater seating area for tubing flare . . . forms a leak-proof joint unaffected by vibration.
★ Three types available – tube to inside iron pipe thread . . . tube to outside iron pipe thread . . . tube to tube.
★ Specially designed for use with

ASARCO Type K TUBE-LOY

★ Tubing extruded from a lead alloy . . . has all of lead's unexcelled resistance to corrosion.
★ Installation is much easier than with other available materials.
★ Nominal sizes – ½", ¾", 1".

GRINNELL

WHENEVER **PIPING** IS INVOLVED



REILLY PIPE ENAMEL

Reilly
COAL TAR
PRODUCTS

● The vital importance of the service rendered by America's pipe lines has been sharply emphasized by war conditions. The protection of these lines is even more essential in war than in peace. The dependable protection which REILLY Enamel gives to pipe lines has been established by years of service. This tough, durable coating prevents corrosion from moisture, electrolysis, soil acids and alkalies. It resists abrasion and soil stress, and withstands wide extremes of temperature without sagging or cracking. As a lining on water lines REILLY Enamel prevents incrustations and tuberculation and insures permanent full-capacity flow.

REILLY coal tar paints give effective, economical protection to tanks, stacks, towers, structural steel and other metal surfaces.

Booklet describing these protective coatings will be sent on request.

REILLY TAR & CHEMICAL CORPORATION
Executive Offices: Merchants Bank Building, Indianapolis, Indiana
2513 S. DAMEN AVENUE, CHICAGO, ILLINOIS · 500 FIFTH AVENUE, NEW YORK, N. Y. · ST. LOUIS PARK, MINNEAPOLIS, MINN.
SEVENTEEN · PLANTS · TO · SERVE · YOU

INCINERATION ENGINEERS
NICHOLS ENGINEERING & RESEARCH CORPORATION
60 WALL TOWER · NEW YORK, N. Y.
Consultants · Designers · Constructors

mits removal of brush for reversing or replacement by inserting screw driver or other sharp object at rear end of holder. An up and outward pry releases tension. Brush pops out. Reverse action for inserting and brush snaps in to a firm, rigid seat.

Every part of the tool is replaceable, and Atlas manufactures a complete line of replacement parts, including interchangeable cone and chisel bits.

For further details in literature, address Atlas Welding Accessories Co., 307 Boulevard Bldg., Detroit, Mich.

Handy Tank Calculator

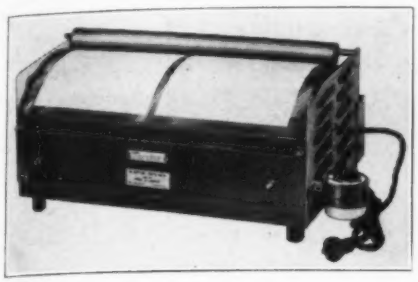
A handy TANK CALCULATOR for designers and users of A.S.M.E. Code pressure vessels is now available through the courtesy of the Buffalo Tank Corp. This pocket size calculator made of glazed finish cardboard, contains a sliding section which may be moved such that the outside diameter of the tank appears in one of four windows, labeled, 75 lb., 100 lb., 125 lb., and 150 lb. In a slot then appears the data on the tank shell and head, including the required thickness, approximate weight, approximate capacity, and other information. Much other pertinent data on the weights of liquids, capacities of tanks and weights of steel plates appears on the calculator. Engineers, executives, or operators may obtain one of these Tank Calculators by writing, on company letter heads, to the Buffalo Tank Corp., 19 Rector Street, New York, N. Y.

"Spee-Dee" Printer

The fast, practical, low-cost "Spee-Dee" Printer for making blue prints or black and white prints has been developed by Peck & Harvey, Chicago. With the "Spee-Dee," either blue prints or black and white prints can be made in half a minute. Developing time for a black and white print is only 10 seconds by the "Directo" process.

The "Spee-Dee" Printer is a

sturdy, convenient, portable table model. It can be plugged into any standard electric outlet and is extremely easy to operate. It comes in two sizes: for prints up to 12x18 and 18x24. The illustration shows the 12x18 "Spee-Dee" Printer with two 8½x11 prints inserted. The actual printing surface is oversize on both size machines. This pre-



vents the crowding of prints, overlapping or blurred edges. Printing on a curved glass surface gives perfect contact without the inconvenience of wrapping the prints around a cylinder.

Tracings, drawings, letters, invoices, or any written or printed matter can be duplicated on the "Spee-Dee," quickly and clearly.

For the modest prices or further details concerning this improved print machine write to Peck and Harvey, 4325 Addison St., Chicago, Ill.

A New Percentage Timer by Cramer

A New Percentage Timer, which automatically controls the percentage of time at which any A.C. circuit can periodically be closed or opened, out of a definite length of a time cycle, has just been made available by The R. W. Cramer Company, Inc., Centerbrook, Conn.

In the field of water treatment it is said to be particularly applicable for controlling the proportionate flow of chemicals for boiler feed water treatment. It is described as having a self-starting synchronous motor which drives a cam operated switch mechanism through the medium of an enclosed gear train. The percentage of operating time is a function of the motor driven cam in relation to a similar stationary cam fixed to a calibrated dial. Varying the position of the stationary cam alters the relation between the contact mechanism and opens and closes it a definite percentage of the total cycle as indicated on the dial.

The timers are available for 7 different time ranges from 30 second

He Does More Than MAKE Them

Manufacturing sanitation equipment is only part of his work.

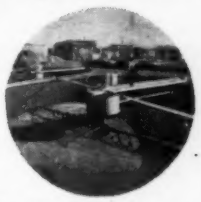
His business is mechanical engineering, the design . . . manufacture . . . application . . . selling and maintenance of special apparatus for sewage disposal and water-treatment.

In order to properly design and manufacture his products, Rex Mechanical Engineering—Rex M. E.—must also perform the functions of application and selling. These are, in some ways, his most important obligations to the Sanitation Engineer.

Application and selling are technical information services provided by specialists to help the sanitation engineer analyze his difficulties and find the best ways for surmounting them.

For this service Rex Mechanical Engineering—Rex M. E.—maintains a territorial organization. Many of the men in it have served their apprenticeship in his drafting rooms and plants. For additional counsel, these field men call on his designing engineers in Milwaukee who have the advantages of national experience.

Through the work of all these men in many fields, Rex M. E. is learning—and making available—much that is helpful in the great work in which all engineers are engaged, namely, to achieve a maximal result at minimal cost and waste. For complete information write Chain Belt Company, 1610 W. Bruce St., Milwaukee, Wis.


Tow-Bro Sludge Remover

Slo-Mixer

Bar Screen

Triturator

REX **SANITATION EQUIPMENT**

Triturators • Bar Screens • Tow-Bro Sludge Removers • Slo-Mixers
Aero-Filters • Rapid Mixers • Grit Collectors and Washers

CHAIN BELT COMPANY OF MILWAUKEE

ANTHRAFILT

A Filter Medium For All Purposes

ANTHRACITE EQUIPMENT CORP.

19 Rector St. New York

H. G. Turner Research Engineer
STATE COLLEGE, PA.

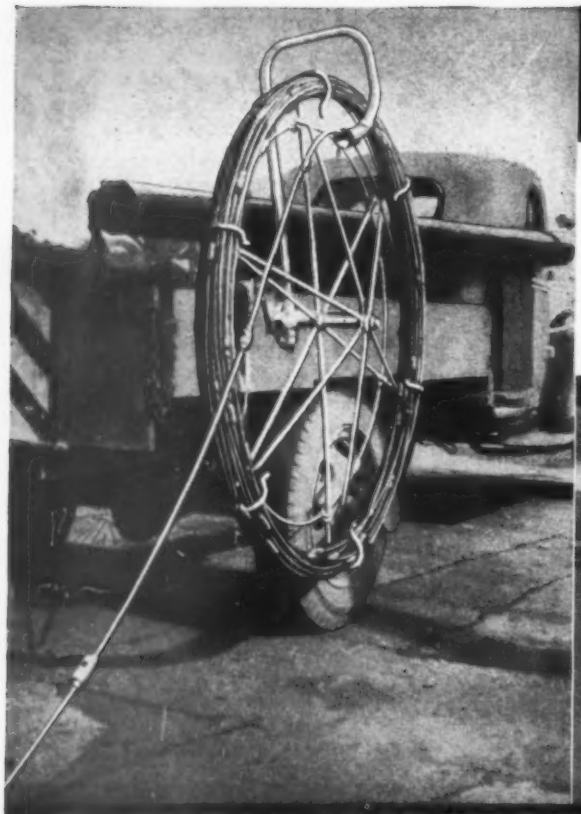
IMPROVED JOINTING COMPOUND

Tegul-MINERALEAD

for Bell & Spigot Main

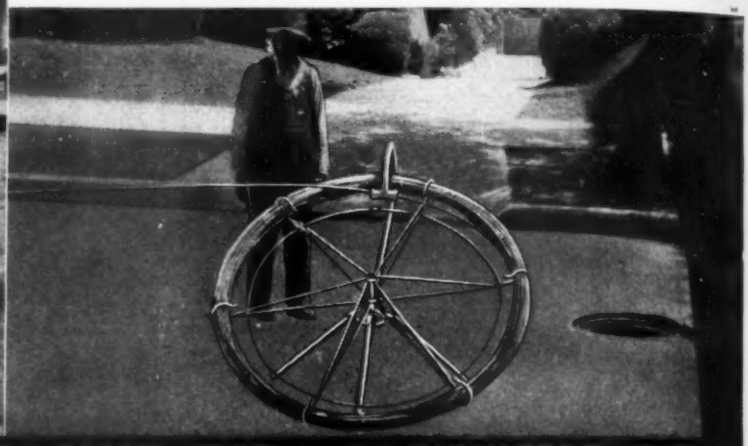
- Sulphur base; quick sealing, speeding laying and backfilling.
- 10 lb. ingot form, easily handled, stored and shipped. Impervious to rain. Cannot change composition.
- Makes permanently tight joints. Goes 3 to 5 times as far as lead, helping conserve a strategic war metal.
- For money-saving information, write

The ATLAS MINERAL Products Company of Pa.
Mertztown Pennsylvania



Sewer Cleaning Made Still Easier with FLEXIBLE "EZY" ROD REEL

Whether you mount the New FLEXIBLE "EZY" Rod Reel on your truck or use it on the ground or pavement, you will do away with all stooping, hooking and unhooking when winding and unwinding FLEXIBLE rods. By means of the holes in the Rod Reel base, the Reel may be used with the "EZY" Reel Stand or it may be quickly and easily mounted on your truck.



FLEXIBLE UNDERGROUND PIPE-CLEANING CO.

9059 Venice Boulevard, Los Angeles, Calif.

401 BROADWAY, NEW YORK • 1624 HARMON PLACE, MINNEAPOLIS • PICKWICK BLDG., KANSAS CITY

New Flow Rate Indicator

Responds INSTANTLY to Flow Changes

THE NEW Rota-Sight flow indicator tells the operator the instant that the flow changes—even with very low flows. • The indicating rotameter-type float gives a wide range over a short scale length. • The float is visible in opaque liquids. • Rota-Sight warns operator of too high or too low flows. • Easy to install—universal inlet and outlet connections. • Nothing to get out of order. • Rota-Sight is inexpensive. • Piping connections for ½" to 2½".

The Rota-Sight is the modern answer to the demand for a sensitive flow rate indicator, applicable wherever an approximation of flow rate is an operating aid or necessity.

For complete information on the Rota-Sight write for Bulletin 101.

FISCHER & PORTER COMPANY

545 COUNTY LINE ROAD, HATBORO, PA.

IS YOUR NAME ON THE LIST?

Become a subscriber now to

WATER WORKS & SEWERAGE

Rates: 1 year $2.00
2 years $3.00

Two months additional for cash with order.

USE THIS COUPON
(Please Print)

Name .....

Title .....

Address .....

(Mail to 330 S. Wells St., Chicago)

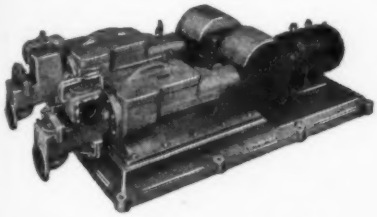
to 60 minutes total cycle. The single pole, single throw contact is rated at 10 amp. at 115 volt or 5 amp.

The entire timer is enclosed in a dust tight molded bakelite case for flush mounting 3¼" diameter and 3 9/32" overall length. It also can be furnished with various types of surface mounting steel connection boxes.

Further information may be obtained from The R. W. Cramer Co., Inc., Centerbrook, Conn.

New Series Midget Feeders

%Proportioneers, Inc.%, Providence, R. I. have recently added a new series of Midget Adjust-O-Feeders to their line of proportioning pumps. These pumps contain many novel design features such as straight through drive shaft which permits operating up to 8 units from a single central motor and a fully



enclosed support frame which presents a pleasing appearance as well as protecting the moving parts from dust and dirt and eliminating the necessity of guards.

The Midget Adjust-O-Feeder is available in either plunger or diaphragm type, and plunger units range in capacities from 0 to 10 GPH. When equipped with Bakelite or plastic cylinders, pumps are capable of discharging against pressures ranging from 0 to 150 lbs. With stainless or iron cylinders, pressures up to 1000 lbs. can be safely handled. Both plastic and metallic measuring cylinders have built-in check valves. The former having rubber or Neoprene face discs and the latter being equipped with balls.

All plunger type Adjust-O-Feeders are equipped with %Proportioneers% FLUID SEALED stuffing gland for hard to handle and corrosive fluids. The fluid seal encloses all moving parts in a flowing water bath, soap solution or a neutral oil, depending upon the job conditions.

Diaphragm type Midget Adjust-O-Feeders are built in capacities ranging from 0 to 7½ GPH and for pressures from 0 to 100 lbs. Diaphragms are preformed reinforced Neoprene, and as no stuffing gland is required, the fluid seal is omitted. Diaphragm

"THIS JOB'S A SNAP. LET'S TOSS TO SEE WHO JOINS THE ARMY."

Maintenance really is a cinch on Mathews Hydrants, because you *never* have to dig one up. Traffic smash? Just unscrew the broken barrel, which contains all operating parts, and put in a new one. Overhauling, modernizing, or replacing? It's all done the same way. For the Mathews frost protection case is a loose sleeve, and the barrel drops through it and screws firmly into the elbow. If you have Mathews Hydrants, just check up on your supply of spare barrels and quit worrying about maintenance men.

MATHEWS HYDRANTS

400 CHESTNUT STREET, PHILADELPHIA, PA.

ESTABLISHED IN 1803

Made by R. D. WOOD Company

MANUFACTURERS OF SAND SPUN PIPE (CENTRIFUGALLY CAST IN SAND MOLDS) AND R. D. WOOD GATE VALVES

The Meter-Master

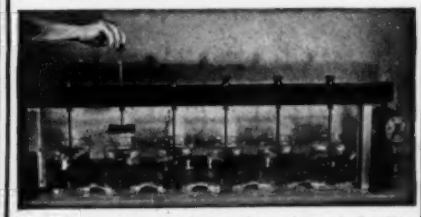
RATE RECORDER FOR WATER METERS

Send for Literature

F. S. BRAINARD & CO.

246 Palm Street, Hartford, Conn.

THE Phipps & Bird LABORATORY MIXER . . .



IS the important piece of equipment in the Modern Water Works Laboratory. Now being used by leaders in water works research. Many superintendents and chemists have been able to reduce their chemical costs by the control of chemical dosages with this mixer. Write for literature.

PHIPPS & BIRD, INC. Richmond, Va.

THESE 3 Westco ADVANTAGES

MEAN IMPORTANT SAVINGS IN YOUR PUMPING JOBS!

TWO-STAGE PERFORMANCE AT SINGLE-STAGE COST

▶ Because of the unique turbine design of Westco Pumps, a *single*-stage Westco will continuously supply high operating pressures that would require a *two*-stage centrifugal pump. Thus, Westcos save on *first* cost...on *operating* cost...*on maintenance!*

PERMIT FUTURE EXPANSION OF SYSTEM

▶ Westco operating characteristics are such that additional outlets can be handled with *decreasing* horsepower requirements... whereas centrifugals would require *additional power* to maintain operating efficiency. In this way, Westcos reduce *both* cost of expansion and cost of operation if future additions to system become necessary.

PROVIDE STANDBY PROTECTION AT LOWEST COST

▶ Westco's *renewable liner* feature eliminates need for an entire separate pump assembly for safe standby protection. By simply keeping an extra liner assembly on hand, Westcos can be quickly and economically renewed at a *fraction* of ordinary cost.

But get the full Westco story of peak performance at unusually low installation and operating costs before you invest in ANY pump equipment. Ask your Westco dealer — or write direct!

On Westco Pumps, wear and corrosion are taken by renewable liners. To renew pump, simply renew liners!

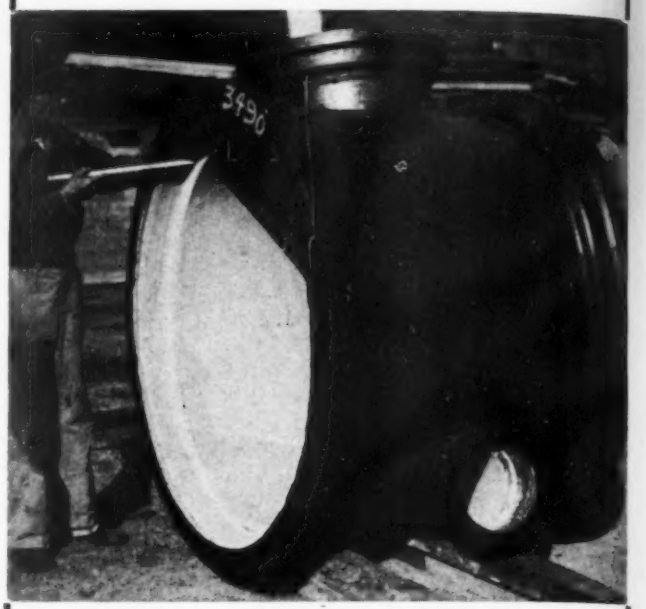
WESTCO-POMONA PUMP CO.

DIVISION OF JOSHUA HENDY IRON WORKS

2621 LOCUST AVENUE, ST. LOUIS, MISSOURI

LARGE DIAMETER PIPE and FITTINGS

Including 48"



This 48"x20"x8" Cast Iron Blow-off Tee is typical of Acipco's complete line of high quality Cast Iron Fittings, available in all sizes. Acipco Large Diameter Pipe are manufactured by the Mono-Cast Centrifugal Process and conform to the latest A.S.A. standards.

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

Sales Offices in Principal Cities

heads are of "see-thru" plastic with built-in suction and discharge check valves having sight feed domes.

Changes in displacement are made through neutralizing eccentrics, one of which is movable and the other fixed. The movable eccentric carries a scale in small increments from 0 to 10, and changes in throw are made by means of special screwdriver furnished with each pump.

Complete engineering details will be supplied by request to %Proportioneers, Inc.%, 9 Codding Place, Providence, R. I.

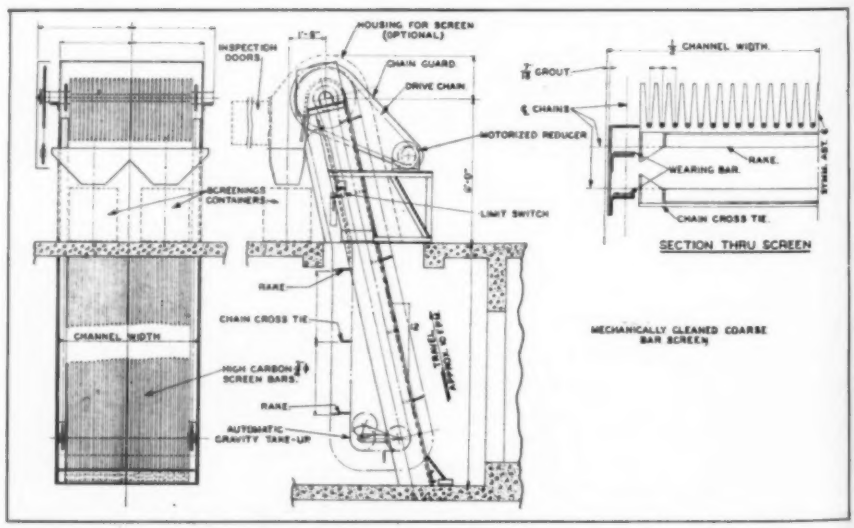
New Jeffrey Bar Screen

The Jeffrey Mfg. Co. of Columbus, Ohio, is offering a new type of mechanically cleaned bar screen which has several features of interest. However, these have been given long period field service tests before being announced.

This new screen is operated by automatic time control, differential control or manual control. The screen proper is constructed from round high carbon steel rods with spacings from 1 in. upwards, with prospects of going as low as ¾ in. spacings. The screen rods are anchored at the bottom only and are supported by the moving rakes and cross ties fastened to side chains. It will be noted that a distinctive feature is the entry of the rake teeth from the rear of the bars. Thereby obstructions are lifted with the screenings and carried upward. The screenings fall off the upper end of the screen after the rakes have passed over the head shaft. Also it will be noted that there is an automatic take-up at the bottom of the channel and a hinged plate to provide always a fixed relationship between the edge of this plate and the path of travel of the rake.

The feature which stands out in this mechanized screen is the raking from the under or back side of the screens, thus precluding forcing screenings into and through the bars.

For further details address The Jeffrey Mfg. Co., Columbus, Ohio.



CLAIMS OR PERFORMANCE —IN ACTIVATED CARBON?

THESE TWO TESTS GIVE THE ANSWER

THRESHOLD ODOR TEST

CARBON FEED CHART

THE way to get more efficient palatability control is to check carbon performance for yourself. Use the Threshold Odor Test. Start a Carbon Feed Chart. Determine now which carbon does the most effective job in your plant.

We'll be glad to send you a sample of Hydrodarco—the activated carbon specially made for water treatment.

HYDRODARCO

Distributing Points: New York, Cincinnati, St. Louis, Buffalo, Chicago, Kansas City, San Francisco, Los Angeles, Marshall, Tex.

Hydrodarco—Reg. U. S. Pat. Off.

DARCO

DARCO CORPORATION

60 East 42nd St., New York, N. Y.

Agar Substitute Produced from Irish Moss

A new and promising substitute for Japanese agar-agar is "CARRAGAR," nonpriority carragheen derivative now being produced on a large scale on the site of the century-old Irish moss industry at Scituate, Mass.

"Carragar" is not to be confused with the conventional Irish moss extract. Its development as a practical jellifying agent is the result of close collaboration with leading authorities in the bacteriological field.

"Carragar" is specifically designed to replace agar-agar, either in its entirety or in major part. Government and university experts have tested its use broadly and its use can now be recommended in the routine preparation of pour plates for water and milk work, and for both semi-solid and deep stab culture media.

The properties, characteristics and general performance of "Carragar" in comparison with agar have been made the subject of an instructive report based on original work by well-known authorities in the bacteriological and genetics fields. A copy of this report may be had by writing to the Krim-Ko Co., Box 311, Scituate, Mass.

WITH THE MANUFACTURERS

Max W. Babb Passes

Max W. Babb, former president and more recently chairman of the board of Allis-Chalmers died March 13 in Milwaukee after an illness of several weeks. He was 68 years old and a native of Mt. Pleasant, Iowa.

Mr. Babb joined the Allis-Chalmers organization in 1904 as the company's attorney. In 1913 he was made vice-president and general attorney of Allis-Chalmers, and in 1932 succeeded the late General Otto H. Falk as president.

In addition to his Allis-Chalmers activities, Mr. Babb had been a director of Cutler-Hammer, Inc., since 1938, and a director of the federal reserve bank for the seventh (Chicago) district since 1930. He was a trustee and a member of the executive committee of the Northwestern Mutual Life Insurance Co.

Active in the Milwaukee Associa-

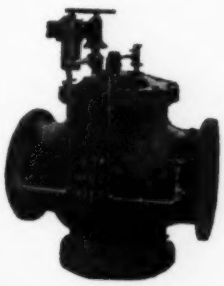
· 1879 ·

ROSS AUTOMATIC VALVES

ALTITUDE VALVES • SURGE • RELIEF • BACK PRESSURE VALVES • FLOAT VALVES • REDUCING AND REGULATING VALVES

ALTITUDE VALVES
for
Control of elevation and heads into and out of tanks, basins and reservoirs.
1. Single acting.
2. Double acting.
3. Combination assembly for three or more automatic operations.

COMBINATION VALVE
Combination automatic control both directions through the valve.
A self-contained unit, with three or more automatic controls.



REMOTE CONTROL VALVE
Electric remote control—solenoid or motor can be furnished.
Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

ROSS VALVE MFG. CO.
INCORPORATED
P. O. BOX 595, TROY, N. Y.

STEWART SEWER CLEANING EQUIPMENT
MACHINES LEASED OR SOLD

WOODEN & STEEL SEWER RODS • STEEL TAPES

ROOT CUTTERS • SEWER CLEANING BUCKETS • CABLE

JUMBO NO. 10 HEAVY DUTY WOOD RODS

Made of Selected Hickory with strong Malleable Iron Couplings, in 2½, 3, 3½ and 4 ft. lengths. Triple Lock, impossible to buckle or uncouple in the sewer. The tongue and groove feature eliminates wear on hook, increasing the length of service.

FREE TRIAL — THE RODS MUST PAY FOR THEMSELVES

Write today for Complete Catalog

MANUFACTURING SEWER CLEANING EQUIPMENT SINCE 1901

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P. O. B. 767 • Syracuse, N. Y.

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of **COAGULATION** *with*

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ISCO FERRIC CHLORIDE

MODERN, EFFICIENT, COAGULANT

[For Precipitation and Sludge Dewatering]

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Established 1816

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tion of Commerce, he was the counselor representing that group in the United States Chamber of Commerce, and was also a member of the American committee of the International

Chamber of Commerce. Mr. Babb was a Mason, and also a member of the Beta Theta Phi fraternity and the University and Milwaukee Country Clubs.

Charlie Thomas Victim of Heart Attack

Charles F. Thomas, Vice-President and General Manager of the Roberts Filter Mfg. Co. of Upper Darby, Pa.,

suffered a heart attack at his desk on April 1st and succumbed at his home one hour later. He was 48 years old, a native of Wilmington, Del.

One of the most popular executives in the water works manufacturers' group, Mr. Thomas was serving on the Board of Governors of the Water and Sewage Works Manufacturers Association, having sat in a special meeting of this Board only the day previous to his death, a perfect specimen of vigor and health.

Charlie Thomas literally grew up with the Roberts Filter Co., which he so admirably served. He went to work with the company in 1910 as a machinist's helper and worked his way into the Engineering Depart-

ment. In World War I he volunteered and saw A. E. F. service amongst the first troops to go to France. He entered the Sales Department after war and his success in this department won him the position of Sales Manager. In 1935 he was made a Vice-President and became General Manager.

At the time of his death he was serving as President of the Water Softener and Filter Institute and a member of the Board of Governors of the Water and Sewage Works Manufacturers Association. Surviving him are his widow and two married daughters.

"Bill" O'Connell Establishes Consulting Practice

W. J. O'Connell, Jr., who ever since his graduation from the University of California has been connected with the Wallace and Tiernan Co., has recently established an of-

fice of his own under the firm name W. J. O'Connell, Jr., TECHNICAL CONSULTANTS — with offices at 525 Market St., San Francisco. With him is associated L. L. Carter.

The new firm specializes in problems involving the chemistry of water and its uses; the treatment and disposal of trade wastes; biological problems in the production, processing and use of water.

During Mr. O'Connell's connection with the Wallace and Tiernan organization he had much to do with developing pressures for the elimination and control of "slimes" in tubular steam condensers, in paper mills and other industrial plants; odor control and chemical treatment of sewages, involving the continuous method of producing chloride of iron known as the Scott-Dacey method.

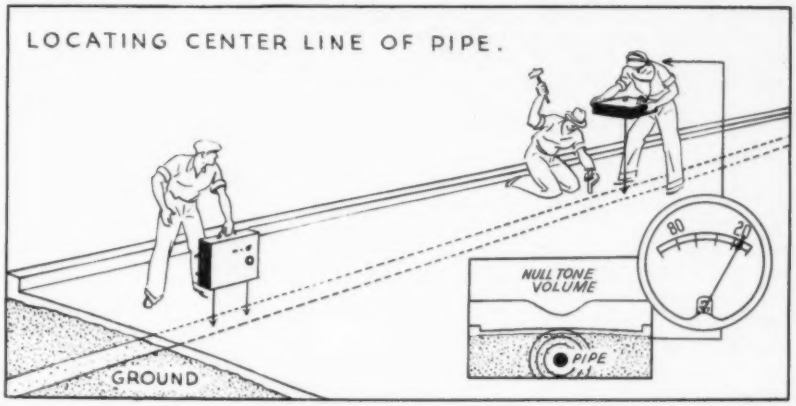
EIMCO Expands Facilities; Promotes Paul Richter

The Eimco Corporation announces the establishment of an additional complete filtration laboratory in connection with their Chicago Office, 111 West Washington St., Chicago, Ill.

The Filtration Engineering staff

M-SCOPE

BURIED PIPE AND CABLE FINDER



The M-Scope is solving—successfully—the varied problems involved in the development, operation and maintenance of buried pipe and cable systems and is in daily use by representative organizations in such important groups as:

Government Projects
Municipalities
Sewerage and Water Plants
Consulting Engineers
Airports
Public Utilities
Industrial Plants
Oil and Pipe Line Companies

Watch for our series of monthly advertisements in *W-W-& S* regarding the use of the M-SCOPE.

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FISHER RESEARCH LABORATORY

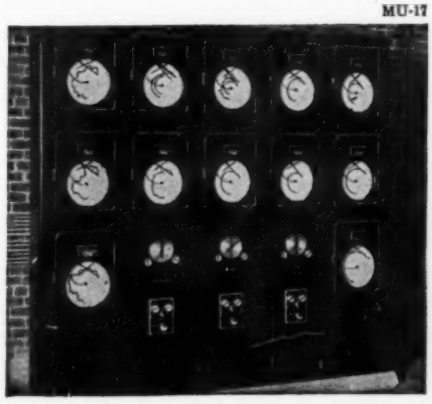
DIRECT TELETYPE BY POSTAL TELEGRAPH PALO ALTO, CALIF.

THE *Bailey Synchro-Meter* GIVES YOU *Flexibility* IN METERING APPLICATIONS

● This meter panel includes both direct mechanically operated Fluid Meters and Bailey Synchro-Meters, which are electrically operated by remote transmitters.

Wherever you have need for a central meter panel incorporating both mechanically and electrically operated Fluid Meters, it is possible to maintain uniformity and neatness by employing this system of transmitting meter and recorder readings.

MU-17



Readings of flow, pressure, temperature, liquid level and other factors are accurately and quickly transmitted from out-of-the-way places to the receiving indicator, recorder or integrator by the Bailey Synchro-Meter.

This electrical mechanism which is completely described and illustrated in Bulletin No. 194-A, can also be used to eliminate the necessity of running high pressure piping up to meter and control panels.

Write for your copy of this new Bulletin.

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Economical-Effective Durable

SERVICISED
SEWER PIPE JOINTING COMPOUNDS

HOT POURED COMPOUND

Servicised Sewer Pipe Jointing Materials have served in the sewerage field through many years.

Our Hot Poured Compound is specially prepared for vitrified clay pipe used in sanitary sewerages.

Servicised Hot Poured Compound is quick setting and produces tough, flexible, long lasting joint connections. This material is shipped in Fiber Drum Containers that open very easily.

TUFFLEX . . . is a cold premixed troweling plastic material that is also widely used in jointing of vitrified clay pipe.

TUFFLEX is especially outstanding for use in wet trenches because the material will set under water, thereby assuring continuous pipe jointing.

The adhesive and cohesive qualities of this excellent compound are resultful in a highly waterproof and root repelling product.

Save time and labor cost by speeding up sewer pipe jointing with TUFFLEX. This material arrives on the job for immediate use.

Millions of pounds of Servicised Sewer Pipe Jointing Materials have been used throughout the country on Federal and Municipal Projects.

Pioneers in the Manufacture of Approved Construction Materials for Over 23 Years
SAMPLES AND DESCRIPTIVE LITERATURE WILL BE SENT UPON REQUEST

SERVICISED PRODUCTS CORP.
6051 West 65th Street, Chicago, Ill.

INSTALLATIONS WORLD WIDE.

LARGEST CITY TO SMALLEST VILLAGE

VALVES COMPLETE EQUIPMENT FOR WATER WORKS FILTRATION AND SEWAGE DISPOSAL PLANTS
LATEST "COREY TYPE" **HYDRANTS**

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IOWA VALVE CO.

General Offices:
Hubbell Bldg., Des Moines, Iowa

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P.F.T. Rotary Distributors at many war plants

Modern sewage treatment plants are the rule in today's military and armament establishments. In many of these, P.F.T. Rotary Distributors are installed to spread the effluent uniformly on the filter beds, assuring maximum utilization of the filtering area.

Write for Bulletin No. 213 containing full information, including engineering data which shows why the P.F.T. is by far the preferred rotary distributor.

P.F.T. PACIFIC FLUSH-TANK CO.
4241 Ravenswood Ave., Chicago
New York Charlotte, N. C.

has also been enlarged, and Mr. Paul Richter has been placed in charge of the Filtration Equipment Department replacing Mr. C. J. Peterson.

Rudy Lowe Elected President of %Proportioneers%

%Proportioneers, Inc.% well known manufacturers of chemical proportioning equipment, have recently announced the election of Rudy P. Lowe as president.

A graduate of Illinois Institute of Technology in 1922, Mr. Lowe served

in Chicago as consulting engineer in the building industry for eight years. Following the depression, he entered the water works field as consulting engineer and in 1932 came to Providence to begin his career in the proportioning business. Prior to his recent election as president, Mr. Lowe served as Proportioneer's vice president and chief engineer.

Mr. Lowe becomes president of the company at a time when proportioning equipment is playing an increasingly important role in wartime. It is reported that over 8,700 Proportioneer's units are now serving the armed forces, American industries and municipalities.

Henry Armbrust Transfers to Builders

Mr. H. S. Chafee, Treasurer of Builders-Providence, Inc. and %Proportioneers, Inc.%, associated companies located at 9 Codding Street, Providence, R. I., announces that Henry N. Armbrust has transferred from %Proportioneers% to Builders-Providence as Research Engineer. In this capacity he will have a leading part in the Company's expanding market and product research program.

Mr. Armbrust first became associated with %Proportioneers% in January of 1935 starting as sales representative in the State of New Hampshire. In October of the same year, he was transferred to the main office and shortly became one of the key men in %Proportioneers% organi-

WATER CONTROL EQUIPMENT

WRITE FOR THE CATALOGS ON THE EQUIPMENT IN WHICH YOU ARE INTERESTED

MUELLER CO.

MAIN FACTORY
DECATUR, ILL.

OTHER FACTORIES
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LOS ANGELES, CALIF.
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BOTH

PAINE FIELD
EVERETT, WASH.

AND

PENDLETON AIR BASE
PENDLETON, OREGON

REORDER*

Lakeside High Capacity

AERO-FILTERS

*First order for Paine received Sept., 1941

*First order for Pendleton received May, 1941

Write for Bulletin 112

Results Obtained by Excellent Distribution and NOT BY RECIRCULATION.

LAKESIDE
ENGINEERING CORPORATION
CHICAGO — ILLINOIS

zation. In his new position he will devote a goodly portion of his time to Proportioneers in the capacity of Consulting Engineer.

Mr. Armbrust is a graduate of Rhode Island State College, class of

1929, with a B.S. in Chemistry. During the past few years he has made a number of original contributions in the water and sewage works field, and it is believed that the new arrangements will provide still further opportunity in this direction.

John Vaughn Is Dead

John J. Vaughn, 56, Vice-President of The Norwood Engineering Co. of Florence, Mass., died suddenly at Northampton, Mass., on March 19.

Mr. Vaughn was well known in the water works field, having been associated with the industry for a great many years. During the past several years he has been head of the Filtration Department at Norwood, and he has done considerable mechanical and architectural designing in the water works field. He was also a past president of the Northampton Board of Water Commissioners.

John Vaughn's active business career was spent with Norwood. He

started with the company in 1906 as a blue print boy, and subsequently working up to assistant draftsman, draftsman, chief draftsman, and finally Vice-President and head of the Filtration Department.

Funeral services and interment were at Northampton on March 22. He is survived by his widow, one son and two daughters.

HYDRO-TITE

HYDRO-TITE — The self-caulking joint compound that makes cast iron water pipe joints — strong — tight — flexible and everlasting. Used on thousands of miles of pipe with a record of more than 30 years without a failure.

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FIBREX — The sanitary paper packing that is used like braided jute. Free from bacteria — treated with a water repellent — put up in 60 pound reels. 70 pounds of Fibrex takes the place of 100 pounds of braided jute.

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DRY BRAIDED
Fibrex

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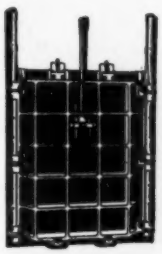

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Metal or timber sluice gates of all sizes and designs, approved by engineers everywhere. Improved gate stands and hoists for hand or motor operation. Also flap and mud valves, shear and filler gates, trash racks and rakes. Dependable canal equipment from dam to tail-race since 1840.

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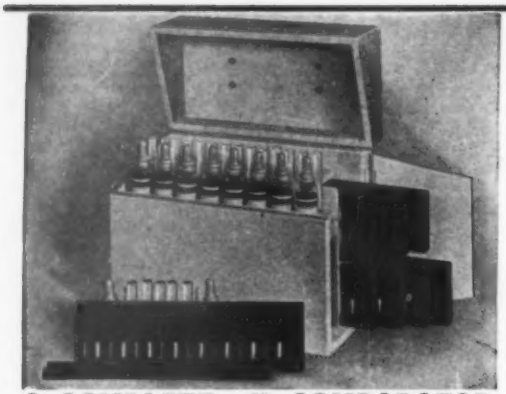
118 Lake St., Orange, Mass., U. S. A.



A COMPLETE pH COMPARATOR

. . designed for portability!

It's the ideal outfit for complete pH control in water purification or sewerage plants! Sturdy wooden carrying case contains non-warping plastic base and 3 color standard slides: chlorphenol red, bromthymol blue and phenol red, pH 5.2 — 8.4, vials of indicator solutions, pipettes and test tubes. Case will hold 8 slides. Chlorine and combination pH and chlorine outfits are also available. All standards carry AN UNLIMITED GUARANTEE against fading.

Only $42

with any three color standard slides

See your dealer or write direct for booklet — "Modern pH & Chlorine Control."

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UNDIVIDED RESPONSIBILITY

• You will be assured of coordinated results and centralized responsibility if your water conditioning plant is completely INFILCO equipped.

• Standardizing on INFILCO Products makes it possible to place undivided equipment responsibility in the hands of one single manufacturer.

• Write today for Bulletin 60—"INFILCO Equipment for Municipal Water and Sewage Plants."

INFILCO INCORPORATED
FORMERLY INTERNATIONAL FILTER CO.
325 W. 25th PLACE, CHICAGO, ILL.

Tentschert Joins "VAREC"

F. F. ("Fritz") Tentschert has recently been appointed Eastern Sanitary Sales Manager by The Vapor Recovery Systems Co. of Compton, Calif., well known manufacturers of safety gas handling devices for industrial as well as sewage plant service.

Mr. Tentschert for some time was connected with the Sanitary Sales Division of the Dorr Co. He has also had experience in the consulting field. From the University of Alabama he came to Rutgers University to complete his training in Sanitary Engineering under Dr. Rudolfs and Prof. Lendell. Upon graduation in 1937 he went to work as sales engineer for the Dorr Co. He is now attached to "Varec's" New York office.

Patton New President T.E.M.A.

Cuyler S. Patton of the American Locomotive Co., was elected President of the Tubular Exchanger Mfr's. Ass'n. at its recent annual meeting held in New York City. Mr. Patton has been prominent in the activities of the Association for many years and has served several terms on its executive committee. The Association has materially con-

SAVE MONEY USE ACTIVATED ALUM and BLACKALUM

STUART-BRUMLEY CORP.
516 North Charles St.
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Hand Sizes 2", 2½", 3", 4"
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tributed to the war effort through standardization of tubular equipment designs and in promoting increased production.

Mr. Patton is Manager of Sales for the Alco Products Division of American Locomotive, and has charge of sales of Heat Exchangers, Condensers, Feed Water Heaters, Evaporators, Tubular Equipment, Code Pressure Vessels, Fabricated Plate Work, Steel Water Pipe and allied lines.

Mr. Patton was graduated from Cornell University in 1918 with the degree of Mechanical Engineer and joined the American Locomotive in 1929.

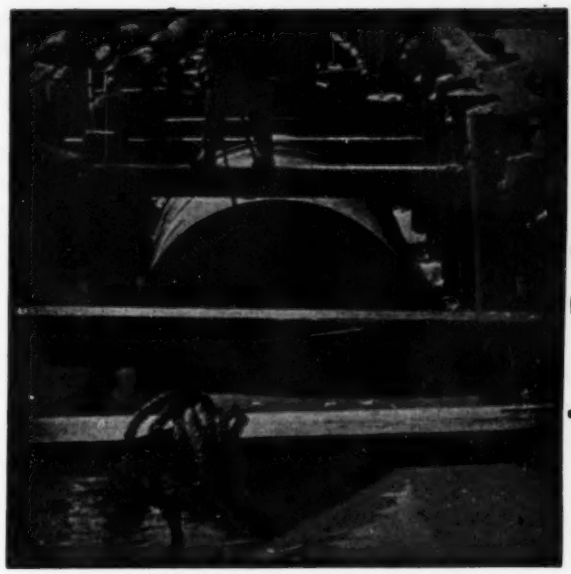
On Acipco's Flagpole Now Flutters an "E" Pennant in Addition to Minute Man

Last month we announced that the American Cast Iron Pipe Co. was listed on Washington releases to receive the Army-Navy Production Award. This award was formally presented to the company on March 24th. The presentation ceremonies

were held in the Service Building Auditorium at Acipco. We have received a copy of the elaborate program, prepared for the occasion, showing the participants in the ceremonies and the men and women who make up the organizational boards and several departments of the company.

Klemme Made Chain Belt's Dallas Manager

Chain Belt Co. announces the appointment of William W. Klemme as District Manager of its Southwest office in Dallas, Texas. Mr. Klemme, previously District Manager at Buf-



84" pipe—Spring Lake, N. J.

FLANGED PIPE
FLEXIBLE JOINT PIPE
BELL & SPIGOT PIPE
SPECIAL CASTINGS
SHORT BODY BELL & SPIGOT SPECIALS

Large stock enables us to make prompt shipments.

CAST IRON PIPE

SIZES 2" TO 84"

Warren Foundry & Pipe Corp.
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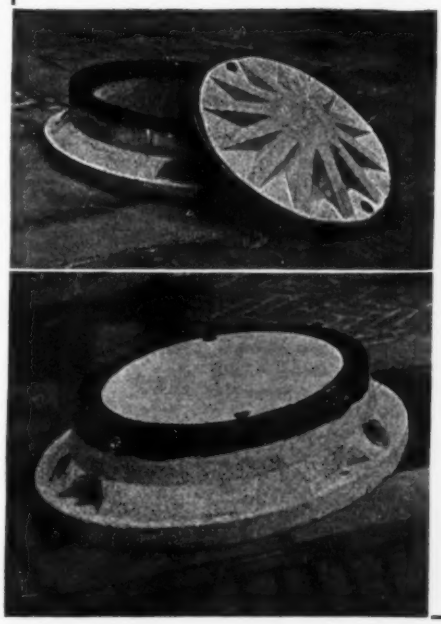
Warren Pipe Company of Mass., Inc.
75 Federal St., Boston

The War Production Board Says . . .
"NO MORE MANHOLE COVERS of Cast Iron"

But six months before this order was issued the Cast Stone Institute and United Concrete Form Products had developed a reinforced concrete manhole frame and cover which were in commercial production throughout the country.

Only this concrete manhole cover offers these advantages:



- Light in weight (cover weighs only 90 lbs.)
- Carries H-20 Highway loading (16,000 lbs. plus 25% for impact)
- Exposed edges "Armored" to prevent chipping due to either rough handling or wear.
- Saves vital steel for its important war job: meets requirements of the War Production Board.

Write for the address of the distributor in your locality . . .

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CONCRETE FORM PRODUCTS CO.
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PITTSBURGH-DES MOINES

ELEVATED STEEL TANKS

Designed, fabricated and erected to meet your municipality's exact requirements. A complete range of types (hemispherical bottoms—hemi-ellipsoidal or toroidal bottoms—double-ellipsoidal designs) and sizes (from 5,000 to 5,000,000 gallons) for maximum performance and economy. Write for Bulletin No. 101.

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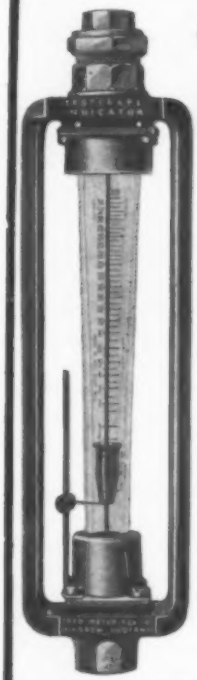


Testerate INDICATOR

Knowing the rate of flow in meter testing is almost as important as knowing that your tanks or scales are accurate. The Ford Testerate Indicator will tell you instantly and accurately the rate of flow in gallons per minute. Hundreds of these instruments are in service.

Ask for more information.

FORD METER BOX CO.,
WABASH, IND.

falo, N. Y., has been connected with the company since 1935. He is a Mechanical Engineer graduate of the University of Wisconsin.

Chain Belt Co. manufactures a complete line of chain belts and power transmission machinery; bulk handling conveyors; sewage disposal equipment and construction machinery.

Robert H. Morse, Jr., Becomes Fairbanks-Morse General Sales Manager

Fairbanks, Morse & Co. has announced the appointment of Robert H. Morse, Jr. as General Sales Manager.

Mr. Morse, Jr. comes to his new duties with a long and varied experience, beginning in 1916, in the

service of the company and its subsidiaries. This experience includes 10 years in the manufacturing divisions, followed by extensive sales experience as Manager successively of the Cincinnati, Dallas, and Boston Branches, and the Stoker Division; and more recently as Assistant Sales Manager.

Serving in the regular Army in 1917 Mr. Morse saw considerable experience in France in World War I.

Greene, Tweed Has New Texas and Southeast Representatives

Greene, Tweed & Co., New York City, manufacturers of Palmetto and other mechanical packings, Basa Soft-Face Hammers and Favorite Reversible Ratchet wrenches, announces the appointment of J. J. McIntosh as Southeastern Sales Representative and B. F. Coombs as Texas Sales Representative.

Mr. McIntosh, with headquarters at 1106 McLynn Ave., Atlanta, Ga., will service Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and East Tennessee.

Mr. Coombs, covering Eastern Texas and Western Louisiana, will operate from his home, Route 12, Box 495, Houston, Texas.

LEADITE

The Pioneer Self-Caulking Material for C.I. Pipe

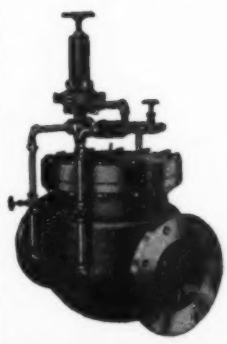
THE LEADITE COMPANY
Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking

Water Pressure Relief Valve

On excess pressure, due to line surges or excess pumping head, this valve automatically opens to dissipate necessary water volume to maintain desired line pressure. The valve is arranged either with atmospheric pilot valve exhaust or self-contained, according to service conditions and requirements.

Valves may be arranged to open at abnormal pressures and held open under subnormal pressures until the surge subsides, and then close when normal conditions prevail.



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Angle and Globe Patterns

Write for Specifications.

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AERO-MIX
AERATOR—MIXER

A Size and Type to Fit Your Problem in Water or Sewage Treatment.

WRITE FOR INFORMATION

Roy M. Smith Is Appointed Roller-Smith Chief Engineer

Roy M. Smith who joined the Roller-Smith Company, Bethlehem, Pa., in August, 1942, as Assistant Chief Engineer has been appointed Chief Engineer, succeeding J. D. Wood, resigned.

Mr. Smith came to Roller-Smith from the Bryant Electric Co., where he was engineering manager for the Wiring Device Division. Prior to this he was with the Westinghouse Electric and Manufacturing Co. as Section Engineer on relay design and application.

Graduated from the University of Washington, Mr. Smith has been active in the American Institute of Electrical Engineers for a number of years.

Victor Arnold Suffers Fatal Fall

Victor E. Arnold, widely known meter and meter parts manufacturer and known to his many friends as "Vic," died on March 18th, as the result of a fall down the stairs of his home the day previous. Not many realized it, but "Vic" Arnold was 74 years old.

Mr. Arnold was President of the Phoenix Meter Corp. of Princes Bay, Staten Island, N. Y. He was a native of Averill Park, N. Y., and a former Superintendent of the Scranton-Spring Brook Water Co. before he joined the Pittsburgh Meter Co. as a salesman, and eventually became New York District Manager for the Pittsburgh-Equitable Meter Co. In 1930 he resigned and bought the Phoenix Meter Co. plant and entered the meter field on his own.

R. H. Kipping Joins Power Specialty Co.

The Power Specialty Co. of Houston, Texas announces the association of Mr. R. H. Knipping with the firm as a member. He will shortly take over the San Antonio, Austin, Corpus Christi territory which he covered some years ago.

Mr. Knipping has had wide experience in the application, operation and servicing of the lines the company handles. Power Specialty Company are the agents for Centrifix Corp., Cochrane Corp., Erie City Iron Works, Foster Engineering Company, Hays Corporation, J. E. Lonergan Company, Lummus Company, R-S Products Corp., and Thomas C. Wilson, Inc.

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on all Problems of
WATER TREATMENT

Whether your problem of water rectification is large or small, we have a form of equipment to serve your needs. We manufacture and install equipment for Gravity Filtration and Softening Plants; Pressure Filters and Zeolite Softeners; Swimming Pool Recirculating Appliances; and Water Treatment Units of all types.

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ODOR and . . . TASTE ARE HEALTH FACTORS-TOO

THE WATER SUPPLY that pleases nose and palate is an important contribution to community health — people drink more of it.

ESOTOO* is the answer to a simple, sure and more economical method of controlling residual chlorine — especially in "break-point" chlorination.

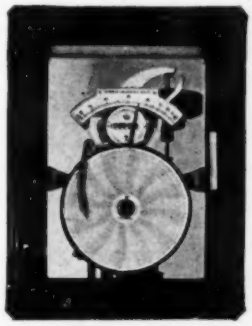
ESOTOO* is the Ideal De-Chlorinator.

Write for bulletin which describes the "Virginia Method" of applying Liquid Sulfur Dioxide for Dechlorination.

*ESOTOO is "Virginia's" Trade Name for Liquid Sulfur Dioxide.

VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA

SPARLING
MAIN-LINE
WATER RECORDS



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